



WIRING DIAGRAMS PARTS LISTING

**FOR
SERIES**

HA

AUTOMATIC DEMAND CONTROLS

**FOR ONAN
SERVICE ORGANIZATION
USE ONLY
(Factory...Distributor...Dealer)**

ONAN

1400 73RD AVENUE N.E. • MINNEAPOLIS, MINNESOTA 55432
A DIVISION OF ONAN CORPORATION

WIRING DIAGRAMS/PARTS LISTING FOR HA AUTOMATIC DEMAND CONTROLS

All of the wiring diagrams apply to HA automatic demand controls and should be used for service and parts information. Before looking up any diagrams, read the description and explanations below.

HA controls use a decimal system model designation previously not used. As an example, the designation 7.5HA was formerly 705HA and 15.0HA was formerly 15HA. Because Spec B controls had both designations, use the decimal system when looking up the wiring diagrams for the 7.5 and 15 KW controls. Therefore, to find the wiring diagram for a Spec B 705HA-21 control, use the Spec B 7.5HA-21 model designation.

NOTE: *The decimal system applies to all of the Spec C controls but to none of the Spec A controls.*

When using the wiring diagrams, remember all components are shown in their de-energized position unless otherwise noted. To find the diagram in question, proceed to the index page shown below corresponding with the control's specification letter (last letter of model designation as shown on control nameplate).

Control Specification Letter	See Index Page
A	2
B	34
C	60

NOTE: *For service and maintenance information of HA controls, see service bulletin "Control 13".*

**INDEX
FOR
SPEC A CONTROLS**

Find the appropriate model and proceed to the indicated page for the wiring diagram.

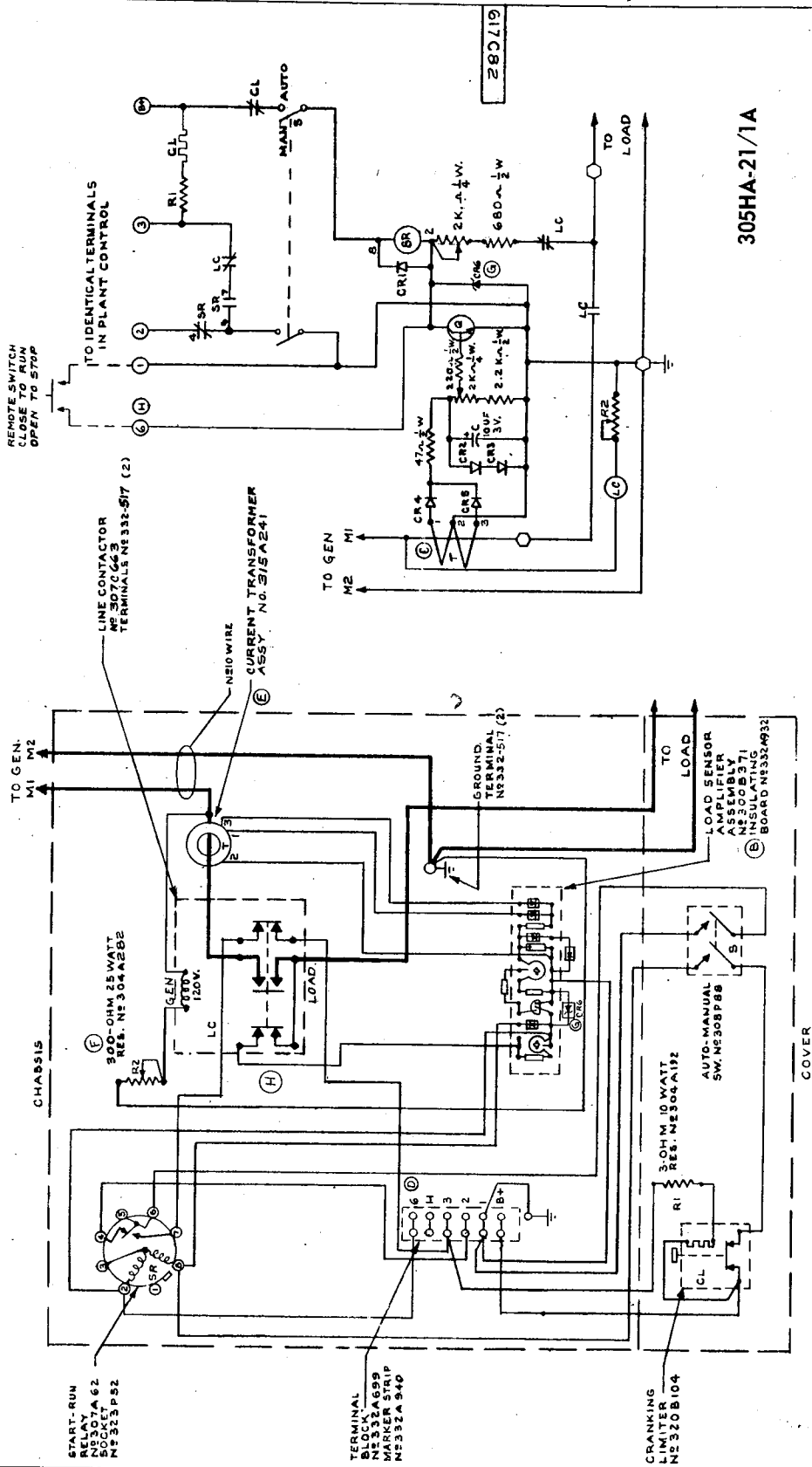
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7,500	705HA-21/1	617C78	7
	705HA-21/10	617C85	8
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15,000	15HA-22/10	617C71	25
	15HA-22-3/10	617C106	26
	15HA-22-3/12	617C107	27
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617 C82

PICTORIAL

SCHEMATIC

305HA-21/1A



NOTE:
WIRES TO LOAD SENSOR AMPLIFIER N220
OTHER WIRES N220 OR LARGER.

WIRE CORR.	REV.	DATE
H	ADDED CR6	10-25-66
G	ADDED CR6	10-25-66
F	ADDED CR6	10-25-66
E	ADDED CR6	10-25-66
D	ADDED CR6	10-25-66
C	ADDED CR6	10-25-66
B	ADDED CR6	10-25-66
A	ADDED CR6	10-25-66
1	ADDED CR6	10-25-66
2	ADDED CR6	10-25-66
3	ADDED CR6	10-25-66
4	ADDED CR6	10-25-66
5	ADDED CR6	10-25-66
6	ADDED CR6	10-25-66
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98	ADDED CR6	10-25-66
99	ADDED CR6	10-25-66
100	ADDED CR6	10-25-66

MODEL	DATE	REV.	DATE
305HA-21/1A	10-25-66	1	10-25-66
20 VOLT 1 PH.			
2 WIRE 50-60W			
12 V. CRANKING			
617 C82			

Original

SECTION OF INSTRUMENT CORPORATION

5-5-65

10-25-66

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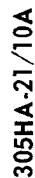
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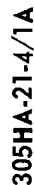
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SCHEMATIC



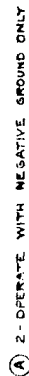
NOTE: WIRES TO LOAD SENSOR AMPLIFIER N°20 OTHER WIRES N°20 OR LARGER.

		DIVISION OF FOREIGNER REGISTRATION	
DATE	14-16-65	CKH	TV, WJB
NAME	AUTOMATIC DEMAND		
NAME	CONTROL WIRING DIAGRAM		
DATE	617 C 79		



A 2- OPERATE WITH NEGATIVE GROUND ONLY

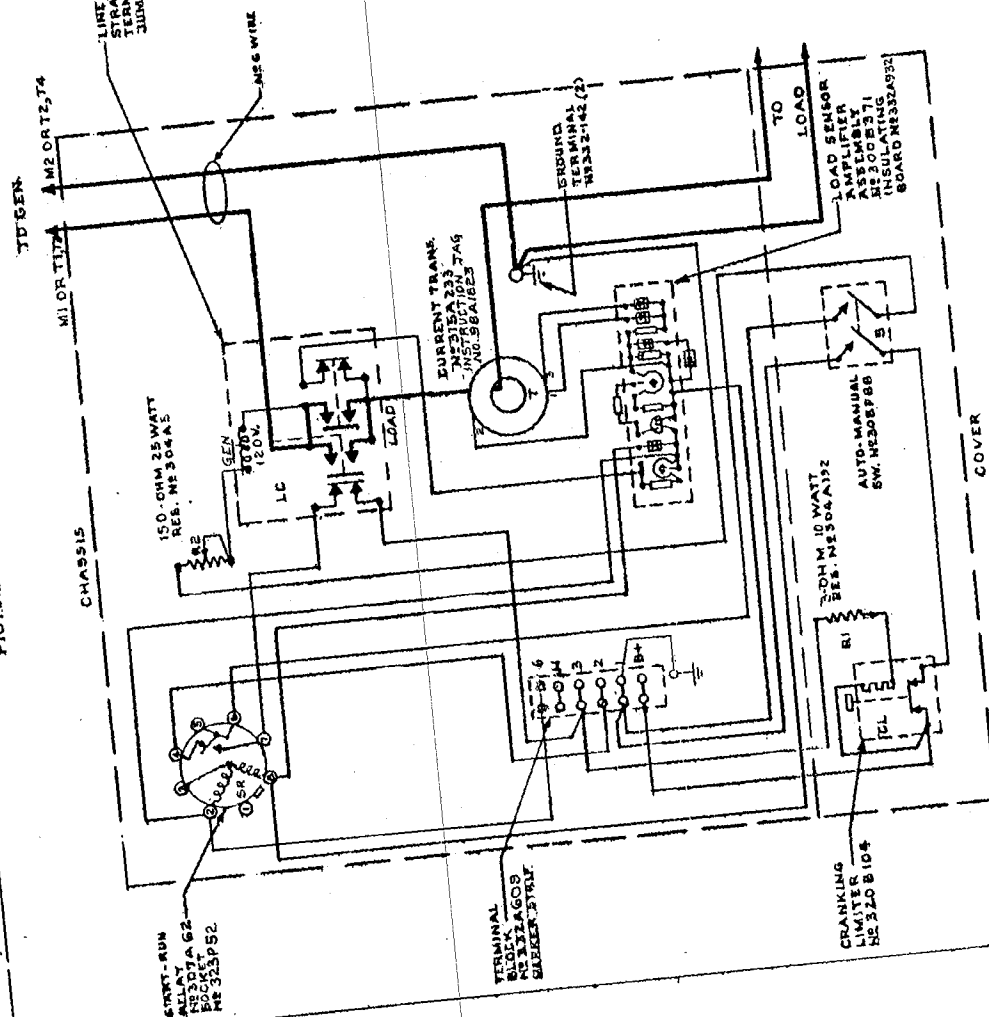
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[illegible]

MODEL
305HA-21-4/10A
125 VOLT 1PH.
2 WIRE 50-60 ~
30 V CRANKING

SCHEMATIC

PICTORIAL



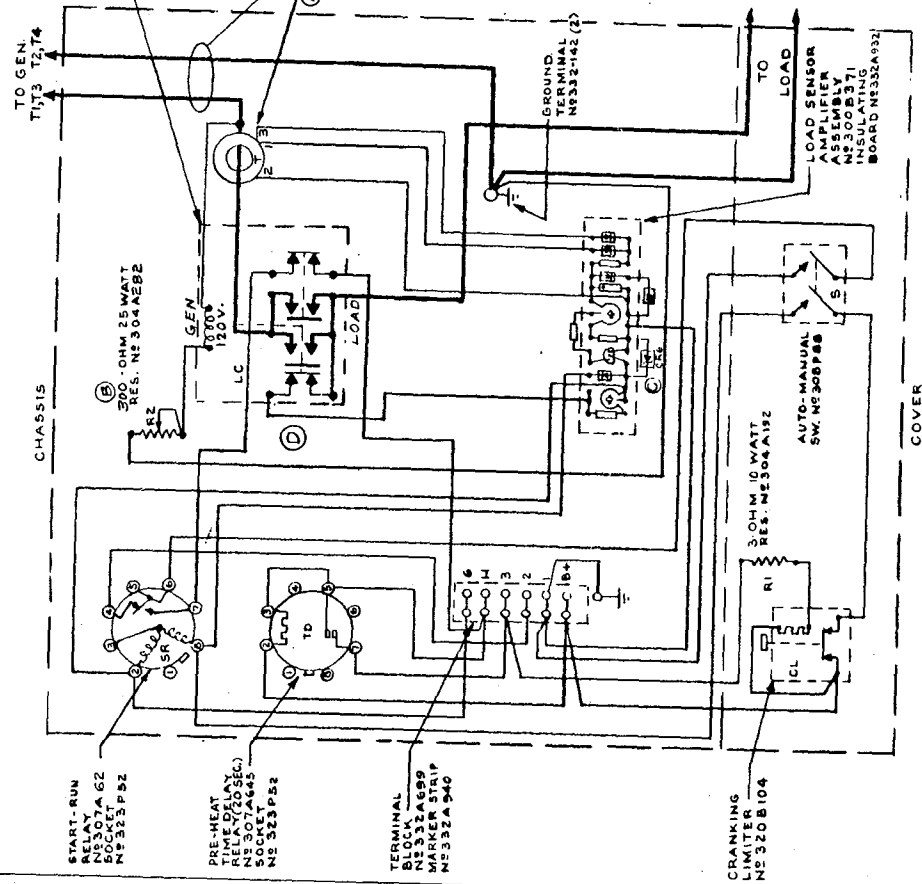
705HA-21/1A

705HA-21/1A		AUTOMATIC DEMAND	
120 VOLT	1 PH. 2 WIRE 50-60-	CONTROL WIRING DIAGRAM	
12 V. CRANKING			617 C 78

617 C85

PICTORIAL

75 HA-21/10A



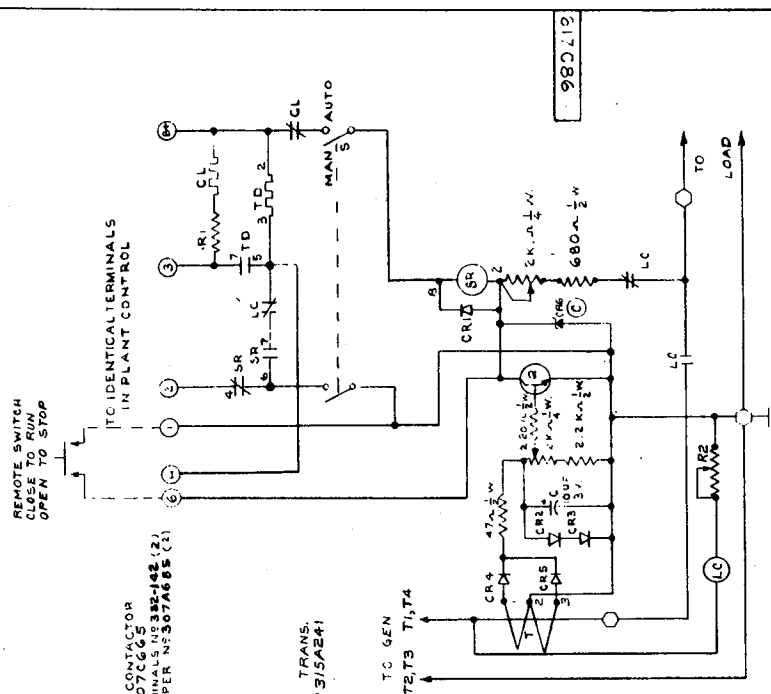
NOTE:
WIRES TO LOAD SENSOR AMPLIFIER N°20
OTHER WIRES N°20 OR LARGER

705HA-21/10A

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13 WAS T1, T4	705HA-21/10A
14 WAS T1, T4	705HA-21/10A
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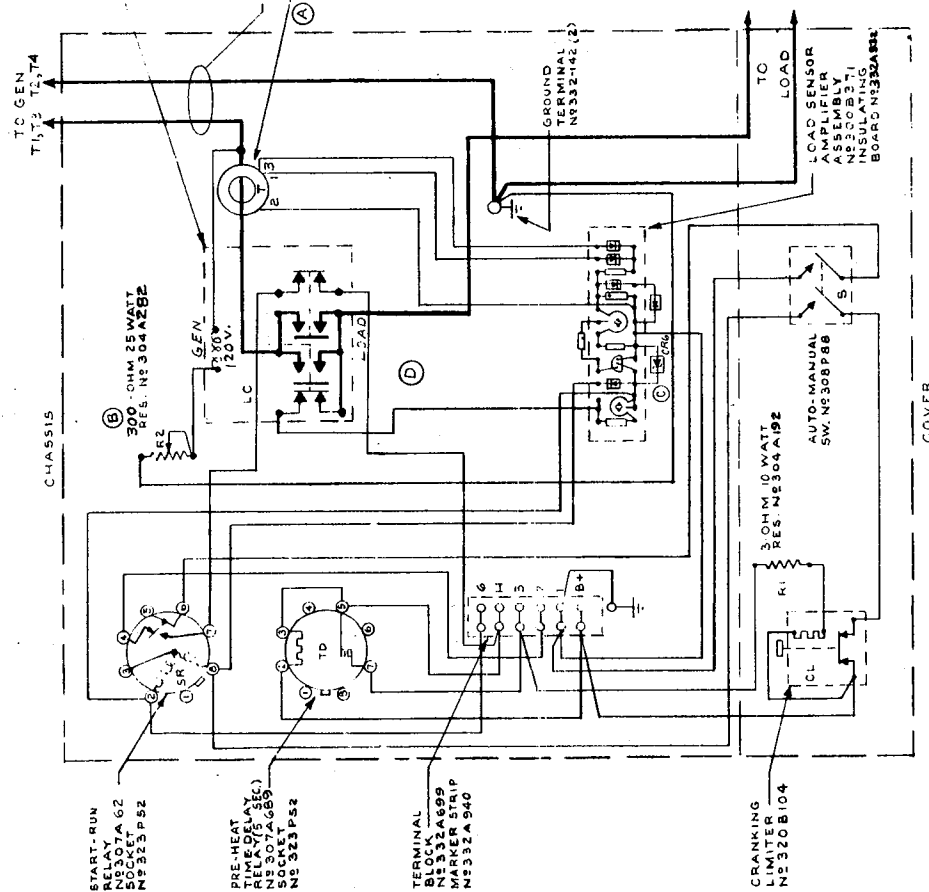
MODEL	75 HA-21/10A	DATE	11-20-65
NAME	75 HA-21/10A	BY	75
120 VOLT	120 VOLT	120 VOLT	120 VOLT
1PH. 2 WIRE 50-60	1PH. 2 WIRE 50-60	1PH. 2 WIRE 50-60	1PH. 2 WIRE 50-60
12 V. CRANKING	12 V. CRANKING	12 V. CRANKING	12 V. CRANKING
617 C85	617 C85	617 C85	617 C85

SCHEMATIC



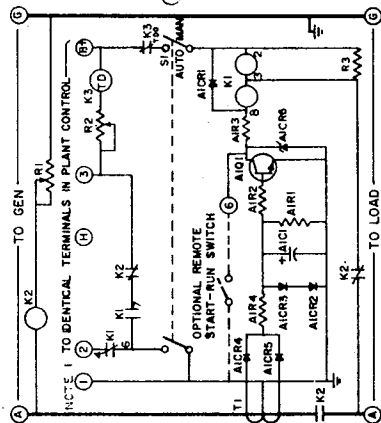
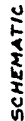
705HA-21/12A

PICTORIAL



NOTE:
WIRES TO LOAD SENSOR AMPLIFIER N° 20
OTHER WIRES N° 20 OR LARGER

[illegible]

[illegible]

705HA-21-3/1A

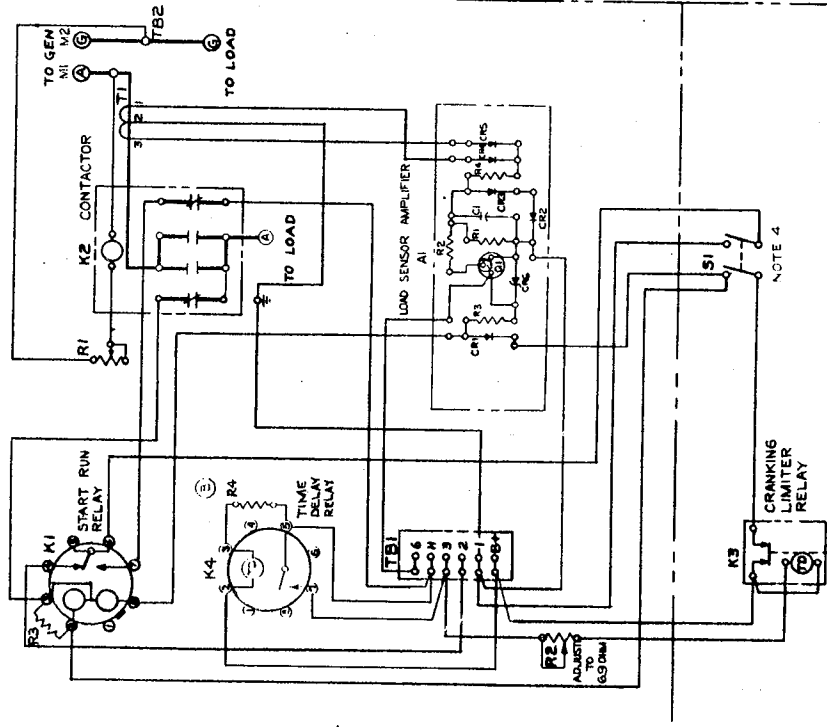
NOTES:

1. IT IS NOT NECESSARY TO CONNECT TERMINAL 1 TO GEN, BECAUSE GENERATOR AND CONTROL ARE CONNECTED THRU THE AC GROUND LEAD.
2. CAUTION - IF GEN IS CONNECTED TO LOAD TERMINALS OF CONTACTOR (X2), THE AC OUTPUT VOLTAGE WILL DESTROY THE LOAD SENSOR AMPLIFIER.

[illegible]

617C115

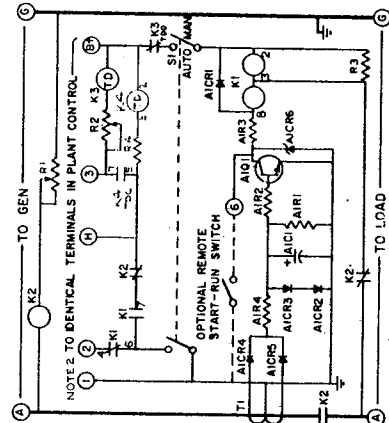
WIRING DIAGRAM
FRONT VIEW OF CHASSIS



NOTES:

1. OPERATE WITH NEGATIVE GROUND ONLY.
2. IT IS NOT NECESSARY TO CONNECT TERMINAL 1 TO GEN. BECAUSE GENERATOR AND CONTROL ARE CONNECTED THRU THE AC GROUND LEAD.
3. CAUTION - IF GEN IS CONNECTED TO LOAD TERMINALS OF CONTACTOR (K2), THE AC OUTPUT VOLTAGE WILL DESTROY THE LOAD SENSOR AMPLIFIER.
4. MOUNT SWITCH WITH FINISHING NUT ON THE FRONT PANEL.

SCHEMATIC



REF DES	PART NO.	QTY	DESCRIPTION
A1	300B462	1	AMPLIFIER ASSY-LOAD SENSOR
K1	302A932	1	BOARD-INSULATING
K1	307A62	1	RELAY-START RUN
K2	307C65	1	CONTACTOR
K3	307A65	2	TERMINAL
K4	307A65	2	JUMPER
R1	304A252	1	RELAY-CRANKING LIMITER
R2	304A252	1	RELAY-TIME DELAY, STARTING (20S)
R3	304A252	1	RESISTOR, 300-0HM, 25W
R4	304A252	1	RESISTOR, 10-0HM, 50W
T1	308P88	1	SWITCH-AUTO MANUAL
T2	315A241	1	TRANS-ASSY-CURRENT
T3	332A699	1	BLOCK-TERMINAL
T4	332A699	1	SILK SCREEN
T5	332A699	1	TERMINAL-GROUND
T6	332A699	1	RESISTOR, 10-0HM, 1W
T7	332A699	1	RESISTOR, 63-0HM, 2W
T8	332A699	1	CONTROL BOX
T9	332A699	1	SILK SCREEN
T10	332A699	1	SILK SCREEN
T11	332A699	1	TRIM
T12	332A699	1	FASTENER-TRIM
T13	332A699	1	SCREW-HEX, NO. 10-32X1/2
T14	332A699	1	LOCKWASHER #10
T15	332A699	1	NAMEPLATE-CONTROL
T16	332A699	1	LABEL, CAUTION
T17	332A699	1	WIRE-FLEXIBLE, NO. 20 AWG
T18	332A699	1	WIRE-FLEXIBLE, NO. 16 AWG

705HA-21-3/10A

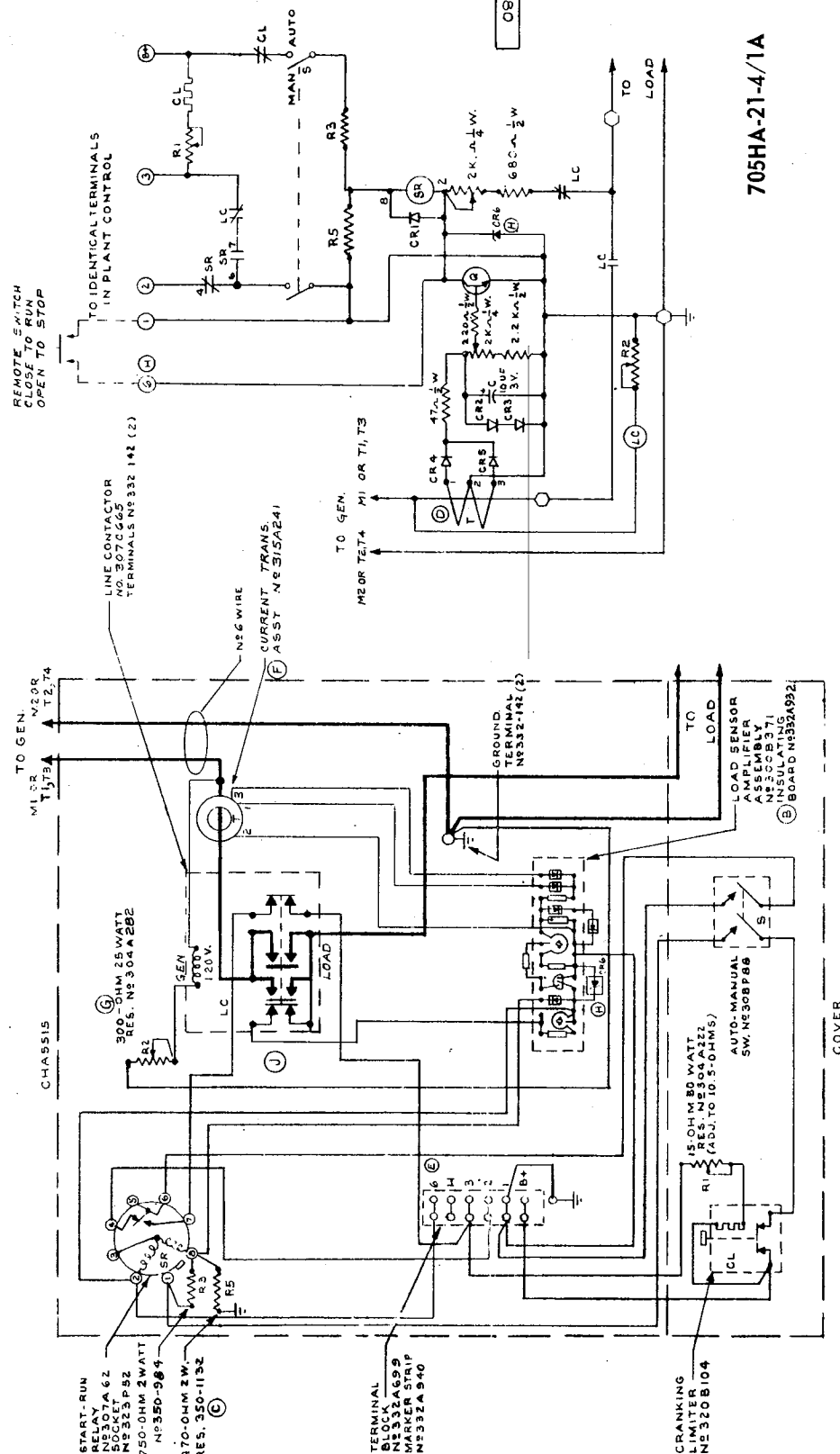
705HA-21-3/10A		SCHEMATIC & WIRING DIAGRAM	
24 VOLT CRANKING		AUTOMATIC DEMAND CONTROL	
120 V, 1 PH		2W, 50/60 CY	
617C115		617C115	

617C80

PICTORIAL

SCHEMATIC

705HA-21-4/1A



NOTE:
1- WIRES TO LOAD SENSOR AMPLIFIER N320
OTHER WIRES N320 OR LARGER

2- OPERATE WITH NEGATIVE GROUND ONLY

705HA-21-4/1A

1	ADDED NOTE 2	27	19-13-66
2	WIRE CONN. CHANGED	28	2-28-66
3	WAS N304A 5	29	2-28-66
4	WAS N304A 5	30	2-28-66
5	WAS N304A 5	31	2-28-66
6	WAS N304A 5	32	2-28-66
7	WAS N304A 5	33	2-28-66
8	WAS N304A 5	34	2-28-66
9	WAS N304A 5	35	2-28-66
10	WAS N304A 5	36	2-28-66
11	WAS N304A 5	37	2-28-66
12	WAS N304A 5	38	2-28-66
13	WAS N304A 5	39	2-28-66
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15	WAS N304A 5	41	2-28-66
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47	WAS N304A 5	73	2-28-66
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53	WAS N304A 5	79	2-28-66
54	WAS N304A 5	80	2-28-66
55	WAS N304A 5	81	2-28-66
56	WAS N304A 5	82	2-28-66
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71	WAS N304A 5	97	2-28-66
72	WAS N304A 5	98	2-28-66
73	WAS N304A 5	99	2-28-66
74	WAS N304A 5	100	2-28-66

Ogen

DIVISION OF INDEPENDENT CORPORATION

4-16-55

CMH

JW HJB

705HA-21-4/1A

AUTOMATIC DEMAND

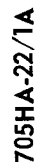
30 VOLT 1P

CONTROL WIRING DIAGRAM


2 WIRE 50-60

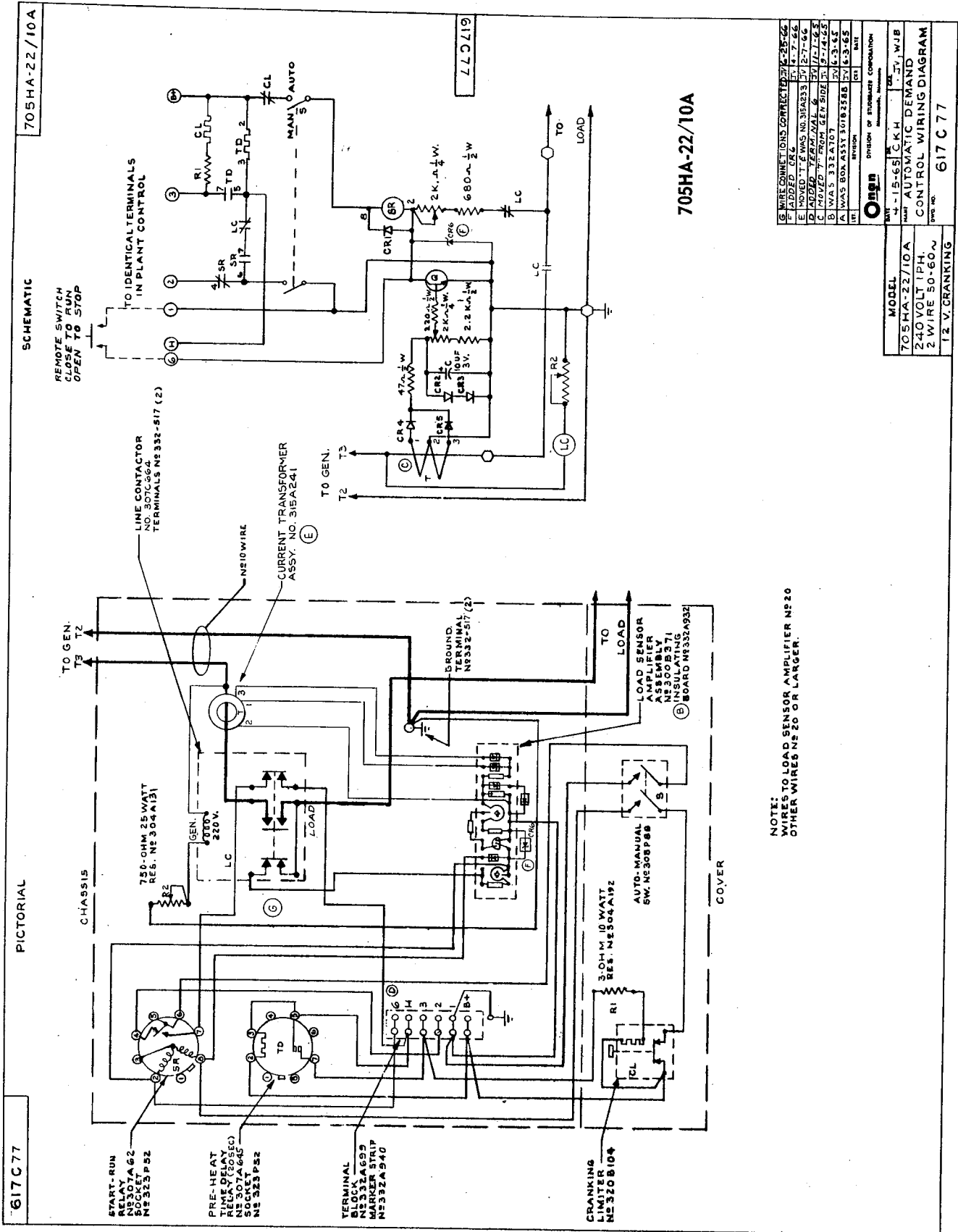
32 V. CRANKING

617 C 80



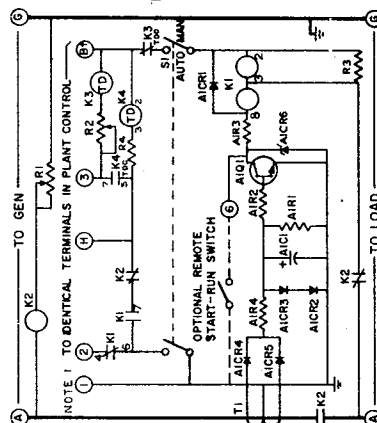
11	REVISION	CR	DATE
10	WAS BOK ASSY. 3012588	TV	6-4-65
9	WAS 332 A707	TV	6-4-65
8	MOVED FROM SEA SIDE	TV	9-14-65
7	ADDED TERMINAL 6	TV	11-1-65
6	MOVED TO EAMS NO 318 A233	TV	2-7-66
5	ADDED CR6	TV	7-7-66
4	WIRE CONN. CORRECTED	TV	6-25-66

 DIVISION OF INVERNESS CORPORATION Inverness, Illinois	
UNIT NO.	5-5-65
MODEL	70SHA-22/1A
YEAR	AUTOMATIC DEMAND
TYPE NO.	617 C83
12 V. CRANKING	240VOLT 1PH. 2 WIRE 50-60~
SERIAL NO.	21, WJB
CONTROL WIRING DIAGRAM	21, WJB



WIRING DIAGRAM

SCHEMATIC

[illegible]

705HA-22-3/10A

[illegible]

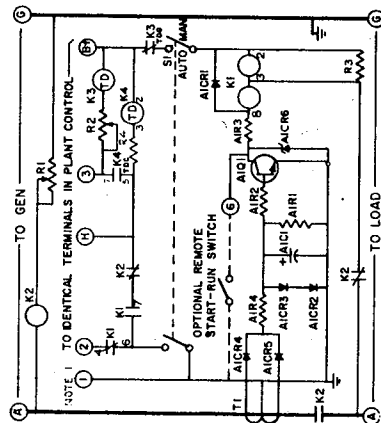
- NOTES:
1. IT IS NOT NECESSARY TO CONNECT TERMINAL 1 TO GEN, BECAUSE GENERATOR AND CONTROL ARE CONNECTED THRU THE AC SOURCE LEAD.
 2. CAUTION - IF GEN IS CONNECTED TO LOAD TERMINALS OF CONTACTOR (K2), THE AC OUTPUT VOLTAGE WILL DESTROY THE LOAD SENSOR AMPLIFIER.

FRONT VIEW OF CHASSIS



1. IT IS NOT NECESSARY TO CONNECT TERMINAL 1 TO GEN, BECAUSE GENERATOR AND CONTROL ARE CONNECTED THRU THE AC GROUND LEAD.
2. CAUTION - IF GEN IS CONNECTED TO LOAD TERMINALS OF CONTACTOR (X2), THE AC OUTPUT VOLTAGE WILL DESTROY THE LOAD SENSOR AMPLIFIER.

PARTS LIST



705HA-22-3/12A

14	A305B	14E	N 384	540	117.5	4.2-6.5
15	G	"	"	544	117.5	4.2-6.5
16	F	WAS	323P52	SOCKET	112	3-4.5-6.7
17	E	"	"	"	112	3-6.7
18	D	11	"	"	112	3-6.7
19	C	11	"	"	112	3-6.7
20	B	11	"	"	112	3-6.7
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99	11	11	"	"	112	3-6.7
100	11	11	"	"	112	3-6.7

Original

ISSUED BY: **INSTRUMENT COMPANION**

DATE: **11-5-67**

BY: **CDR**

FOR: **617C110**

SCHEMATIC & WIRING DIAGRAM

AUTOMATIC DEMAND CONTROL

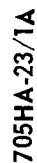
Part no.

705HA-22-3/2A

24 VOLT CRANKING

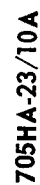
2W, 1PH, 60CY

617C110




⑥ 2- OPERATE WITH NEGATIVE GROUND ONLY

[illegible]



⑥ 2-OPERATE WITH NEGATIVE GROUND ONLY

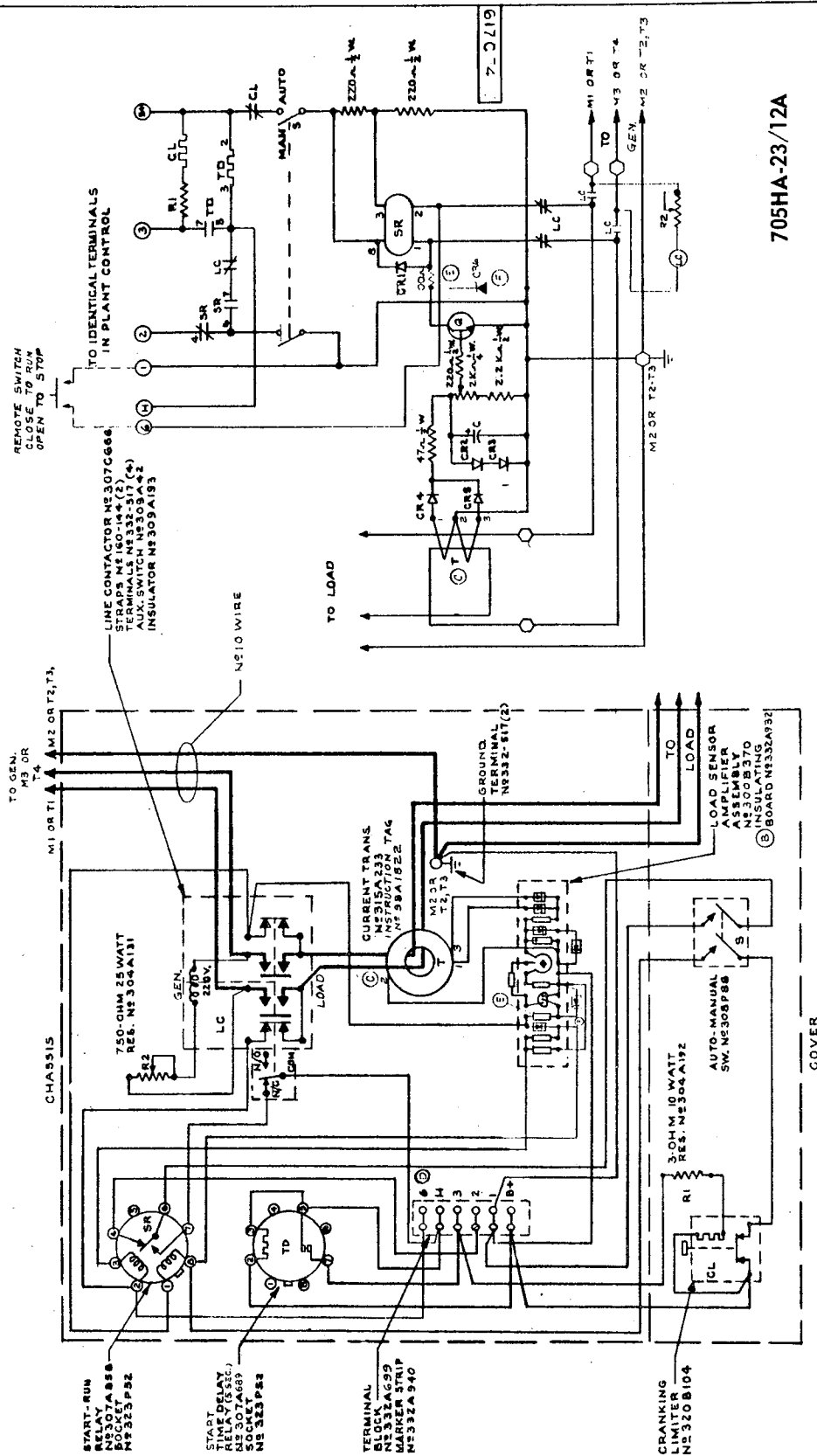
6	ADDED NOTE 2	TV 9-13-66
F	ADDED CR6	JL 4-13-66
E	ADDED 100+ RES	JV 4-13-66
D	ADDED TERMINAL 6	JV 11-1-65
C	MOVED " " FROM GEN SIDE	JL 9-18-65
B	WAS N 332A707	6-4-65
A	WAS 808 A33Y N 3016388	6-4-68
REF	INSTRON	CES DATE

 DIVISION OF FORDAHL CORPORATION AUTOMATIC DEMAND CONTROL WIRING DIAGRAM		617 C75 12 V. CRANKING 1PH, 3 WIRE 50-60A 120-240 VOLT 705HA-23/10A MODEL	
PART NO. 51-555 C A H		JTY, WJB 120-240 VOLT	

817C74

PICTORIAL

75HA-23/12A



NOTE:
1- WIRES TO LOAD SENSOR AMPLIFIER N320
OTHER WIRES N220 OR LARGER.

2- OPERATE WITH NEGATIVE GROUND ONLY

DATE	BY	REVISION
4-8-65	CKM	77, 718
75HA-23/12A		
120-240VOLT		
1PH. 3 WIRE 50-60		
12 V. CRANKING		
617 C74		

DATE	BY	REVISION
4-8-65	CKM	77, 718
75HA-23/12A		
120-240VOLT		
1PH. 3 WIRE 50-60		
12 V. CRANKING		
617 C74		

DATE	BY	REVISION
4-8-65	CKM	77, 718
75HA-23/12A		
120-240VOLT		
1PH. 3 WIRE 50-60		
12 V. CRANKING		
617 C74		

DATE	BY	REVISION
4-8-65	CKM	77, 718
75HA-23/12A		
120-240VOLT		
1PH. 3 WIRE 50-60		
12 V. CRANKING		
617 C74		

DATE	BY	REVISION
4-8-65	CKM	77, 718
75HA-23/12A		
120-240VOLT		
1PH. 3 WIRE 50-60		
12 V. CRANKING		
617 C74		

DATE	BY	REVISION
4-8-65	CKM	77, 718
75HA-23/12A		
120-240VOLT		
1PH. 3 WIRE 50-60		
12 V. CRANKING		
617 C74		

DATE	BY	REVISION
4-8-65	CKM	77, 718
75HA-23/12A		
120-240VOLT		
1PH. 3 WIRE 50-60		
12 V. CRANKING		
617 C74		

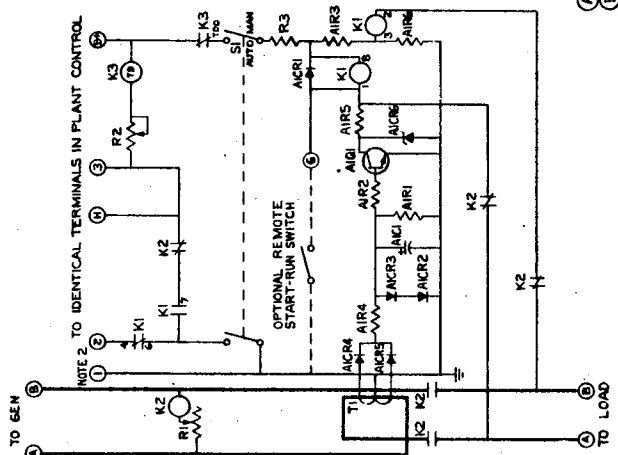
DATE	BY	REVISION
4-8-65	CKM	77, 718
75HA-23/12A		
120-240VOLT		
1PH. 3 WIRE 50-60		
12 V. CRANKING		
617 C74		

DATE	BY	REVISION
4-8-65	CKM	77, 718
75HA-23/12A		
120-240VOLT		
1PH. 3 WIRE 50-60		
12 V. CRANKING		
617 C74		

DATE	BY	REVISION
4-8-65	CKM	77, 718
75HA-23/12A		
120-240VOLT		
1PH. 3 WIRE 50-60		
12 V. CRANKING		
617 C74		

DATE	BY	REVISION
4-8-65	CKM	77, 718
75HA-23/12A		
120-240VOLT		
1PH. 3 WIRE 50-60		
12 V. CRANKING		
617 C74		

FRONT VIEW OF CHASSIS



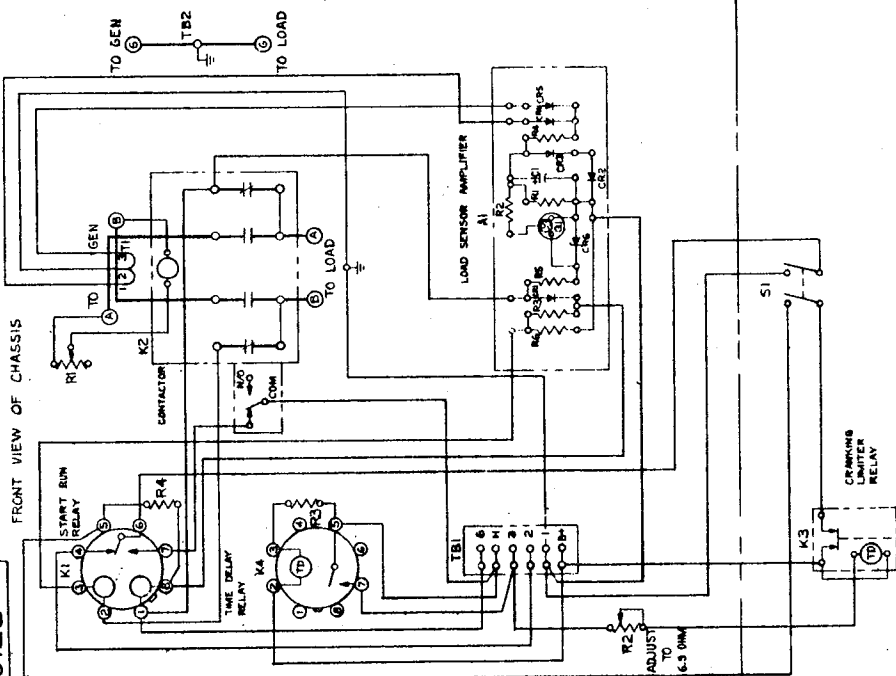
705HA-23-3/1A

703HA-23-3/A	703HA-23-3/A	UNIT	23-66	IN	CDR	15-1-71	211P
24 VOLT CRANKING	24 VOLT CRANKING	UNIT	23-66	IN	CDR	15-1-71	211P
1207/240 V., 1 PH., 50/60 CY	1207/240 V., 1 PH., 50/60 CY	UNIT	23-66	IN	CDR	15-1-71	211P

NOTE: 1 - OPERATE WITH NEGATIVE GROUND ONLY

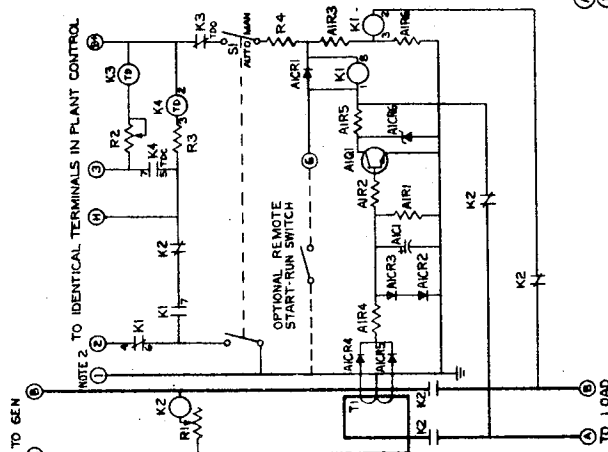
617C122

WIRING DIAGRAM



REAR VIEW OF DOOR .

SCHEMATIC



PARTS LIST

[illegible]

705HA-23-3/10A

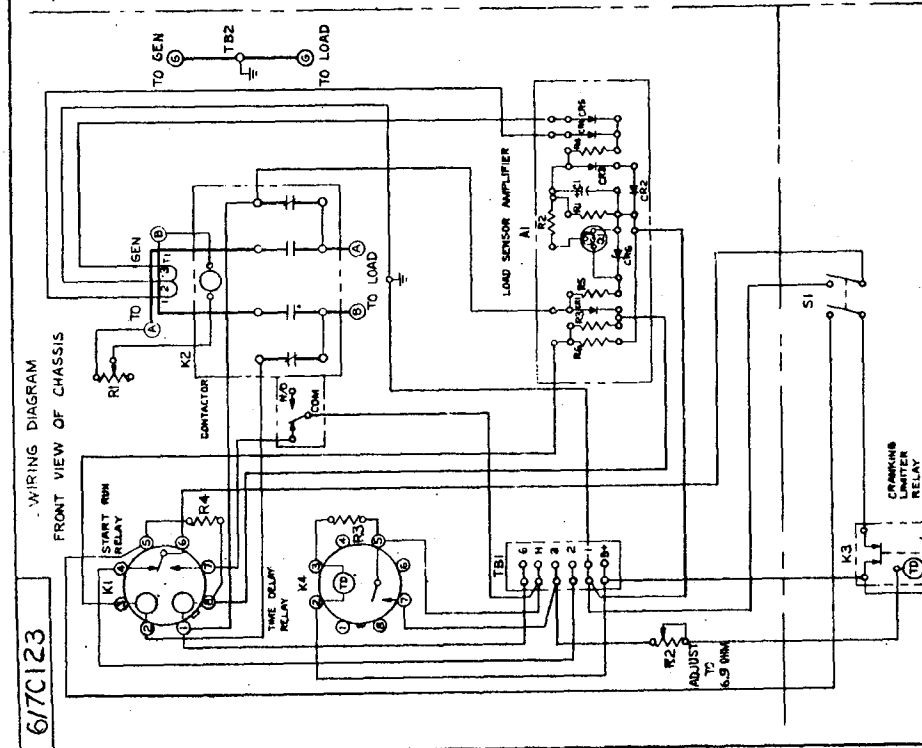
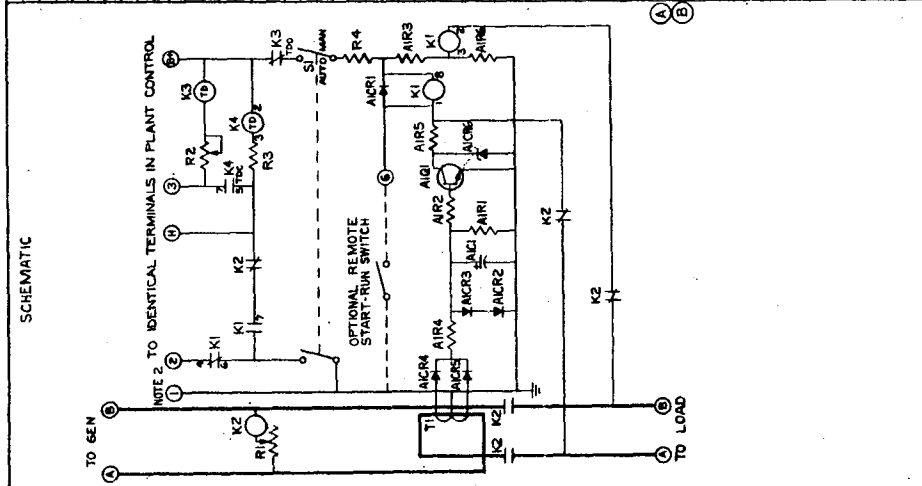
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2	GRADE	
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4	BRANCH	
5	UNIT	
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3. CAUTION - IF GEN IS CONNECTED TO LOAD TERMINALS OF CONTACTOR (K2), THE AC OUTPUT VOLTAGE WILL DESTROY THE LOAD SENSOR AMPLIFIER.
2. IT IS NOT NECESSARY TO CONNECT TERMINAL 1 TO GEN, BECAUSE GENERATOR AND CONTROL ARE CONNECTED THRU THE AC GROUND LEAD.

NOTE: 1 - OPERATE WITH NEGATIVE GROUND ONLY

REFDES	PART NO	QTY	DESCRIPTION
A1	3008463	1	AMPLIFIER ASSY - LOAD SENSOR
K1	3076928	1	RELAY - START RUN
K2	3076928	1	RELAY - START RUN
K3	3076928	1	RELAY - START RUN
K4	3076928	1	RELAY - START RUN
R1	304A131	1	RESISTOR, 750 OHM, 25W
R2	304A222	1	RESISTOR, 15 OHM, 50W
S1	308P98	1	SWITCH - AUTO MANUAL
T1	315A291	1	TRANS. ASSY - CURRENT
T2	332A699	1	TRANS. ASSY - CURRENT
T3	332A699	1	TRANS. ASSY - CURRENT
T4	332A699	1	TRANS. ASSY - CURRENT
T5	332A699	1	TRANS. ASSY - CURRENT
T6	332A699	1	TRANS. ASSY - CURRENT
T7	332A699	1	TRANS. ASSY - CURRENT
T8	332A699	1	TRANS. ASSY - CURRENT
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T94	332A699	1	TRANS. ASSY - CURRENT
T95	332A699	1	TRANS. ASSY - CURRENT
T96	332A699	1	TRANS. ASSY - CURRENT
T97	332A699	1	TRANS. ASSY - CURRENT
T98	332A699	1	TRANS. ASSY - CURRENT
T99	332A699	1	TRANS. ASSY - CURRENT
T100	332A699	1	TRANS. ASSY - CURRENT

705HA-23-3/12A



REAR VIEW OF DOOR

- CAUTION - IF GEN IS CONNECTED TO LOAD TERMINALS OF CONTACTOR (K2), THE AC OUTPUT VOLTAGE WILL DESTROY THE LOAD SENSOR AMPLIFIER.
- IT IS NOT NECESSARY TO CONNECT TERMINAL 1 TO GEN, BECAUSE GENERATOR AND CONTROL ARE CONNECTED THRU THE AC GROUND LEAD.

NOTE: 1 - OPERATE WITH NEGATIVE GROUND ONLY

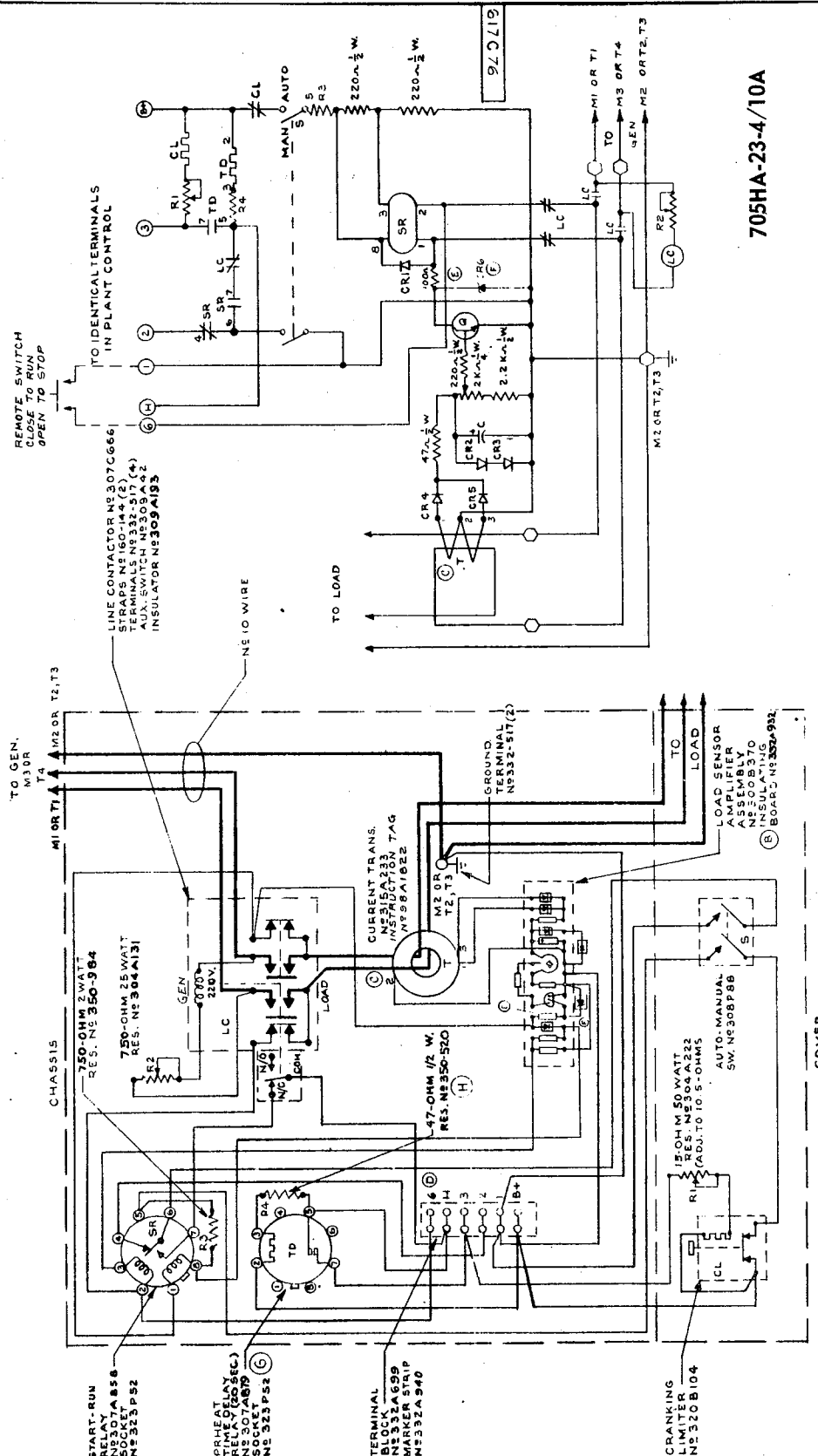
705HA-23-3/12A	CDR	617C123
24 VOLT CRANKING		
120/240 V, 1PH,		
3 WIRE, 50/60 CY.		

617 C 76

PICTORIAL

SCHEMATIC

705HA-23-4/10A



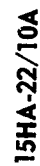
705HA-23-4/10A

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98	1000	1000	1/19-13-66
99	1000	1000	1/19-13-66
100	1000	1000	1/19-13-66


NOTE:
1- WIRES TO LOAD SENSOR AMPLIFIER N° 20
OTHER WIRES N° 20 OR LAR'S

2- OPERATE WIT- NEGATIVE GROUND ONLY

MODEL	4-9-65	CKH	W J B
705HA-23-4/10A			
120-240 VOLT			
1PH, 3 WIRE 50-60			
32 V. CRANKING			
617 C 76			

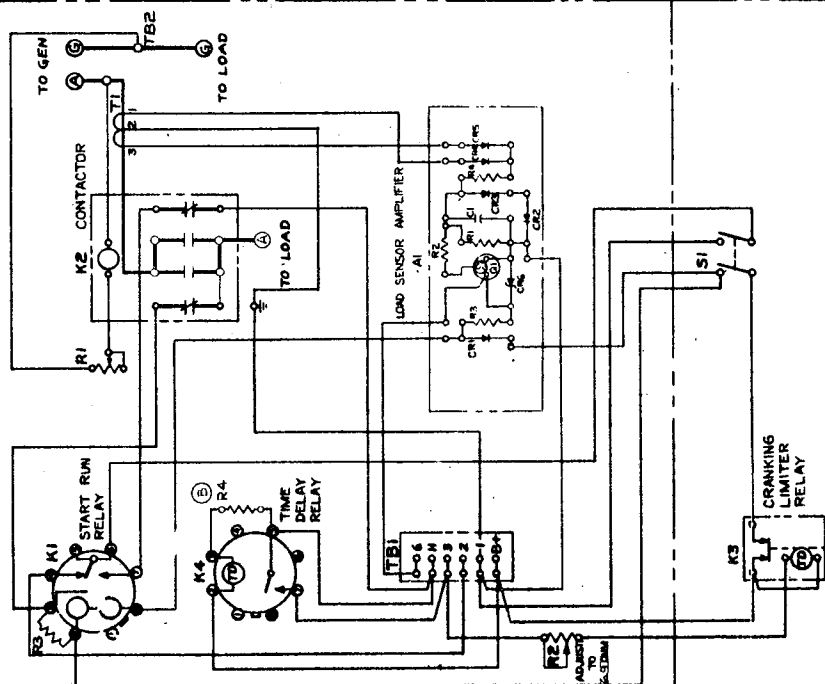


FILE	ADDED	CRG	REV	DATE
F	ADDED	CRG	1	4-7-66
E	MOVED TO	WAS 30154358	TV	2-7-66
D	ADDED	TERMINAL C	IV	10-19-65
C	MOVED TO	FROM SEN SIDE	IV	10-19-65
B	WAS	332 A 757	1	4-7-63
A	WAS	BOX 455A 3018358	1	0-3-65

MODEL	15HA-23/10A	240VOLT	1PH. 2WIRE 50-60W	12 V CRANKING
DATE	12-65	CKH	JVI:JB	617 C 71
 DIVISION OF STUDEBAKER CORPORATION Automobiles, Trucks, Buses				
AUTOMATIC DEMAND				
COT WIRING DIAGRAM				

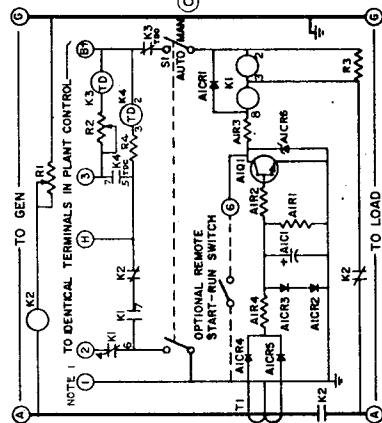
617C106

WIRING DIAGRAM
FRONT VIEW OF CHASSIS



- NOTES:
1. IT IS NOT NECESSARY TO CONNECT TERMINAL 1 TO GEN, BECAUSE GENERATOR AND CONTROL ARE CONNECTED THRU THE AC GROUND LEAD.
 2. CAUTION - IF GEN IS CONNECTED TO LOAD TERMINALS OF CONTACTOR (K2), THE AC OUTPUT VOLTAGE WILL DESTROY THE LOAD SENSOR AMPLIFIER.

SCHEMATIC



NOTE: 1. TO DETECT TERMINALS IN PLANT CONTROL

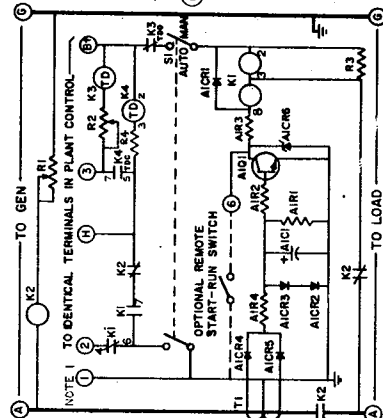
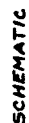
REF ID	PART NO.	QTY	DESCRIPTION
A1	300B482	1	AMPLIFIER ASSY-LOAD SENSOR
K1	322A932	1	BOARD-INSULATING
K2	307A62	1	RELAY-START RUN
K3	323P380	1	SOCKET
K4	307G666	1	CONTACTOR
K5	332-142	2	TERMINAL
K6	307A655	2	JUMPER
K7	320B104	1	RELAY-CRANKING LIMITER
K8	307A645	1	RELAY-TIME DELAY PREHEAT
K9	323P380	1	SOCKET
R1	304A131	1	RESISTOR 750-OHM 25W
R2	304A66	1	RESISTOR 10-OHM 50W
R3	308P68	1	SWITCH-AUTO MANUAL
R4	315A241	1	TRANS-ASSY-CURRENT
TB1	322A699	1	BLOCK-TERMINAL
TB2	322A699	1	BLOCK-TERMINAL
TB3	322A699	1	BLOCK-TERMINAL
TB4	322A699	1	BLOCK-TERMINAL
TB5	322A699	1	BLOCK-TERMINAL
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TB82	322A699	1	BLOCK-TERMINAL
TB83	322A699	1	BLOCK-TERMINAL
TB84	322A699	1	BLOCK-TERMINAL
TB85	322A699	1	BLOCK-TERMINAL
TB86	322A699	1	BLOCK-TERMINAL
TB87	322A699	1	BLOCK-TERMINAL
TB88	322A699	1	BLOCK-TERMINAL
TB89	322A699	1	BLOCK-TERMINAL
TB90	322A699	1	BLOCK-TERMINAL
TB91	322A699	1	BLOCK-TERMINAL
TB92	322A699	1	BLOCK-TERMINAL
TB93	322A699	1	BLOCK-TERMINAL
TB94	322A699	1	BLOCK-TERMINAL
TB95	322A699	1	BLOCK-TERMINAL
TB96	322A699	1	BLOCK-TERMINAL
TB97	322A699	1	BLOCK-TERMINAL
TB98	322A699	1	BLOCK-TERMINAL
TB99	322A699	1	BLOCK-TERMINAL
TB100	322A699	1	BLOCK-TERMINAL

15HA-22-3/10A

H	ADDED WIRE NO. 33441840	1	WIRE-14-6
G	"	"	"
F	WAS 323P52	1	SOCKET
E	"	"	"
D	ADDED NOTES 1 & 2	1	"
C	ADDED WIRE NO. 33441840	1	WIRE-14-6
B	ADDED WIRE NO. 33441840	1	WIRE-14-6
A	WAS 323P52	1	SOCKET
UT	"	"	"

15HA-22-3/10A	15HA-22-3/10A	15HA-22-3/10A
24 VOLT CRANKING	24 VOLT CRANKING	24 VOLT CRANKING
240 V, 1 PH.	240 V, 1 PH.	240 V, 1 PH.
2W, 50/60 Hz	2W, 50/60 Hz	2W, 50/60 Hz

FRONT VIEW OF CHASSIS



REFDES	PART NO.	QTY	DESCRIPTION
A1	300B482	1	AMPLIFIER ASSY-LOAD SENSOR
	332A932	1	BOARD-INSULATING
K1	307A62	1	RELAY-START RUN
	323P380	1	SOCKET
K2	307C666	1	CONTACTOR
	332-142	2	TERMINAL
	307A155	2	JUMPER
K3	320B104	1	RELAY-CRANKING LIMITER
K4	307A669	1	RELAY-TIME DELAY, STARTING ES
	323P380	1	SOCKET
R1	304A131	1	RESISTOR, 250-OHM, 25W
R2	304A66	1	RESISTOR, 10-OHM, 50W
S1	308P68	1	SWITCH-AUTO MANUAL
T1	315A241	1	TRANS. ASSY- CURRENT
TB1	332A699	1	BLOCK-TERMINAL
	98A1927	1	SILK SCREEN
TB2	332-142	2	TERMINAL-GROUND
R3	304A47	1	RESISTOR, 15-OHM, 15W
R4	352-114	1	RESISTOR, 42-OHM, 2W
	96A2045	1	CAUTION LABEL
	301D2573	1	CONTROL BOX
	98C1815	1	SILK SCREEN
	98A1957	1	SILK SCREEN
	301B2586	1	TRIM
	518P237	3	FASTENER- TRIM
	815-17B	1	SCREW-MEX HD #8-32X1/16
	850-30	1	LOCKWASHER #10
	99A950	1	NAMEPLATE-CONTROL
	334A1890	25FT	WIRE-FLEXIBLE NC-22-A-5
	334A1842	12FT	WIRE-FLEXIBLE NC-16-A-5
			70101719

15HA-22-3/12A

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○ 科學城

UNITED STATES DEPARTMENT OF JUSTICE
DIVISION OF INVESTIGATION

On 10/10/2001

87/4	200	100
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15MA-22-3/12F
24 VOLT CRANKING

SCHEMATIC WIRING DIAGRAM

240 V 1 PH

Page 102
AUTOMATIC DEMAND CONTROL

NOTES:

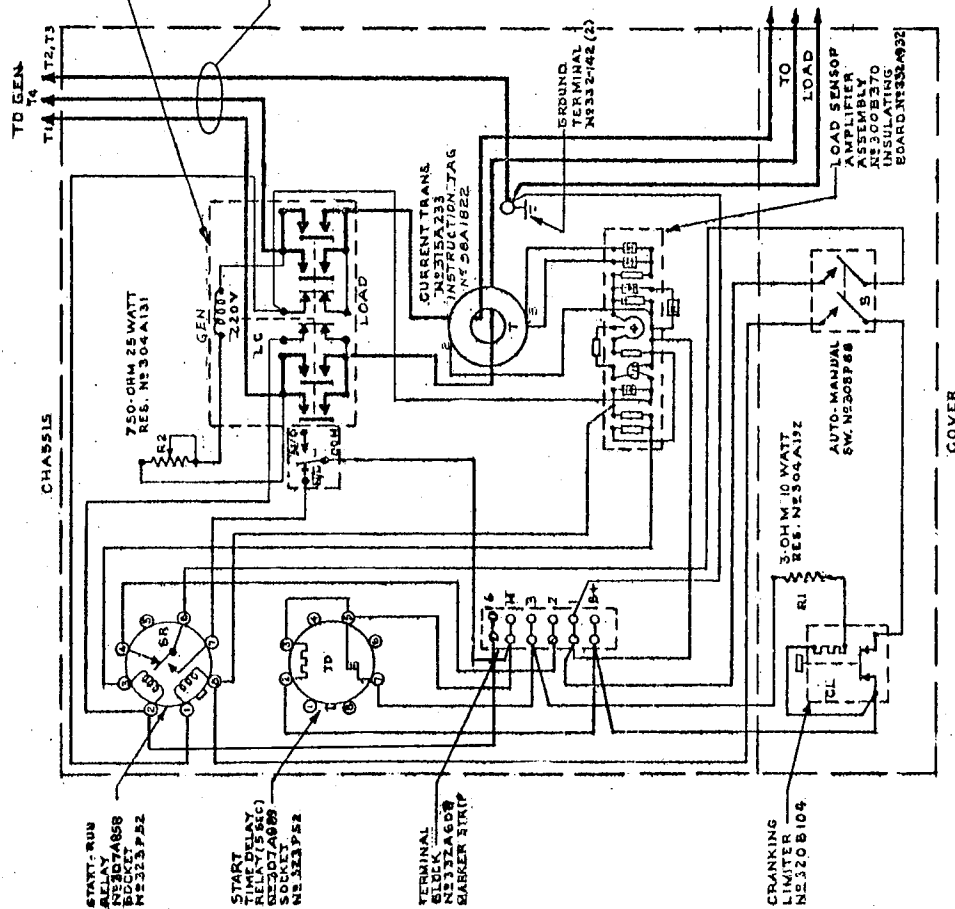
1. IT IS NOT NECESSARY TO CONNECT TERMINAL 1 TO GEN, BECAUSE GENERATOR AND CONTROL ARE CONNECTED THRU THE AC GROUND LEAD.
2. CAUTION - IF GEN IS CONNECTED TO LOAD TERMINALS OF CONTACTOR (K2), THE AC OUTPUT VOLTAGE WILL DESTROY THE LOAD SENSOR AMPLIFIER.



6) 2-OPERATE WITH NEGATIVE GROUND ONLY

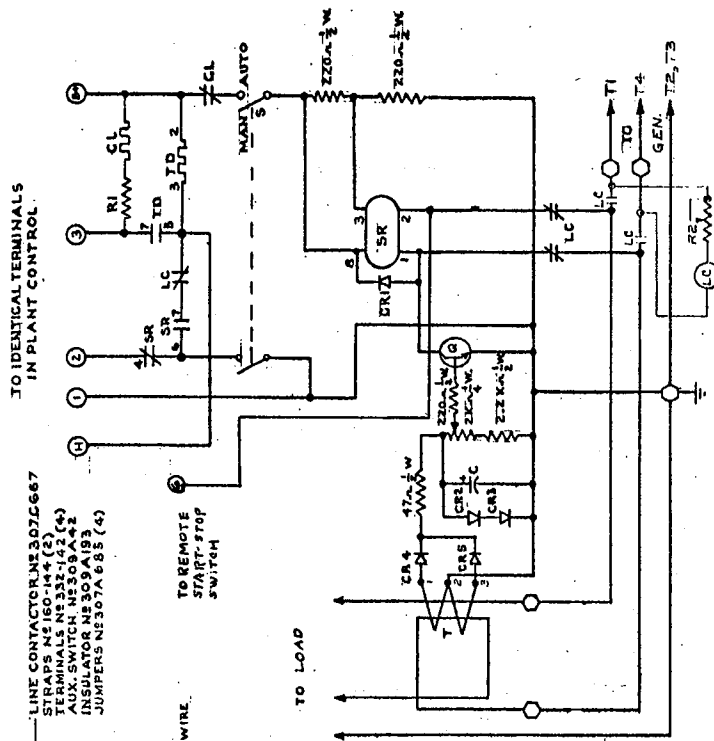
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PICTORIAL



NOTE:
WIRES TO LOAD SENSOR AMPLIFIER N220
OTHER WIRES N220 OR LARGER.

SCHEMATIC



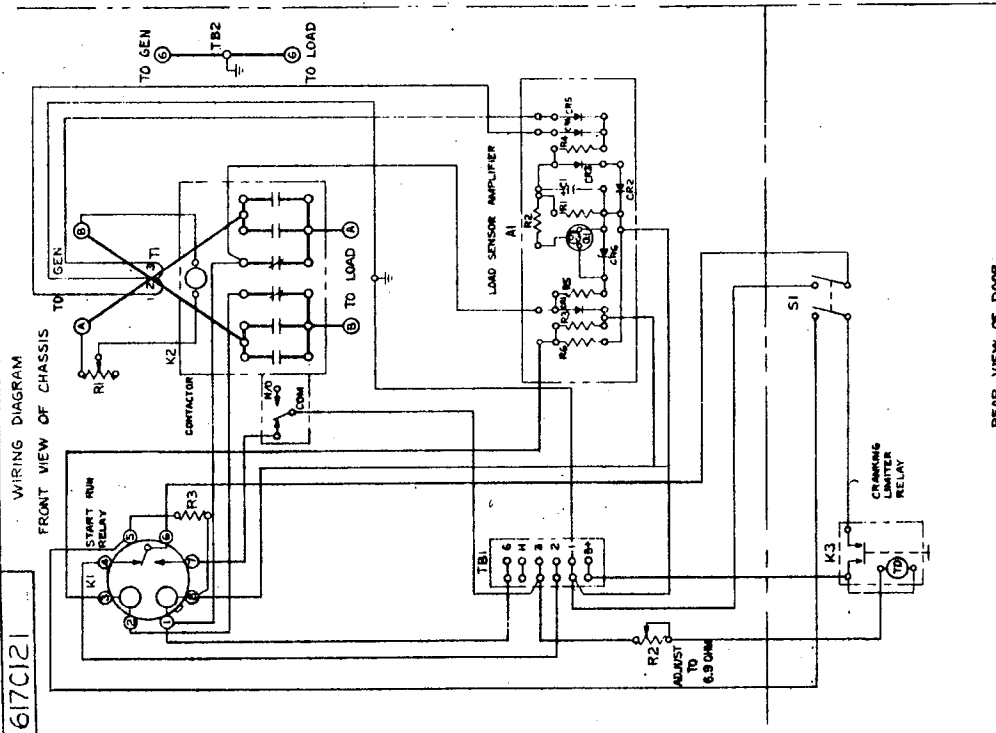
15HA-23/12A

15HA-23/12A	120-240 VOLT	12 V. CRANKING	517 C 69
AUTOMATIC DEMAND CONTROL WIRING DIAGRAM			

617C121

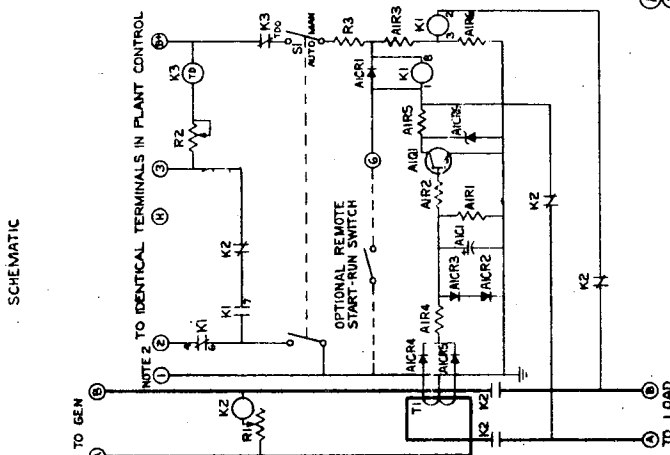
WIRING DIAGRAM

FRONT VIEW OF CHASSIS



REAR VIEW OF DOOR

SCHEMATIC



PARTS LIST

REF DES	PART NO.	QTY	DESCRIPTION
A1	300B463	1	AMPLIFIER ASSY - LOAD SENSOR
	332A332	1	BOARD - INSULATING
K1	307A858	1	RELAY - START RUN
	323P380	1	SOCKET
K2	307C667	1	CONTACTOR
	307A685	4	JUMPER
	160-144	2	STRAP
	307A942	2	BUS BAR
	332-142	4	SLEEVING 1/4" OF (89B-22)
	309A442	1	SWITCH - AUX
	309A193	1	INSULATOR
	98A2045	1	CAUTION LABEL
K3	320B104	1	RELAY - CRANKING LIMITER
R1	304A131	1	RESISTOR, 750 OHM, 25 W
R2	304A222	1	RESISTOR, 15 OHM, 50 W
R3	350-354	1	RESISTOR, 750 OHM, 2 W
S1	308P88	1	SWITCH - AUTO MANUAL
T1	315A233	1	TRANS. ASSY - CURRENT
TB1	332A639	1	BLOCK - TERMINAL
	98A1927	1	SILK SCREEN
TB2	332-142	2	TERMINAL - GROUND
	301D3573	1	CONTROL BOX
	98A1945	1	SILK SCREEN
	98A1949	1	SILK SCREEN
	301B556	1	TRIM
	518P237	3	FASTENER - TRIM
	815-178	1	SCREW - REL TO DO-32 X 5/8 LG
	850-30	1	LOCKWASHER #0
	99A966	1	NAMEPLATE - CONTROL
	121C119		
	354A1890	25	FT WIRE - FLEXIBLE NO.20 AWG
	354A1842	12	FT WIRE - FLEXIBLE NO.16 AWG

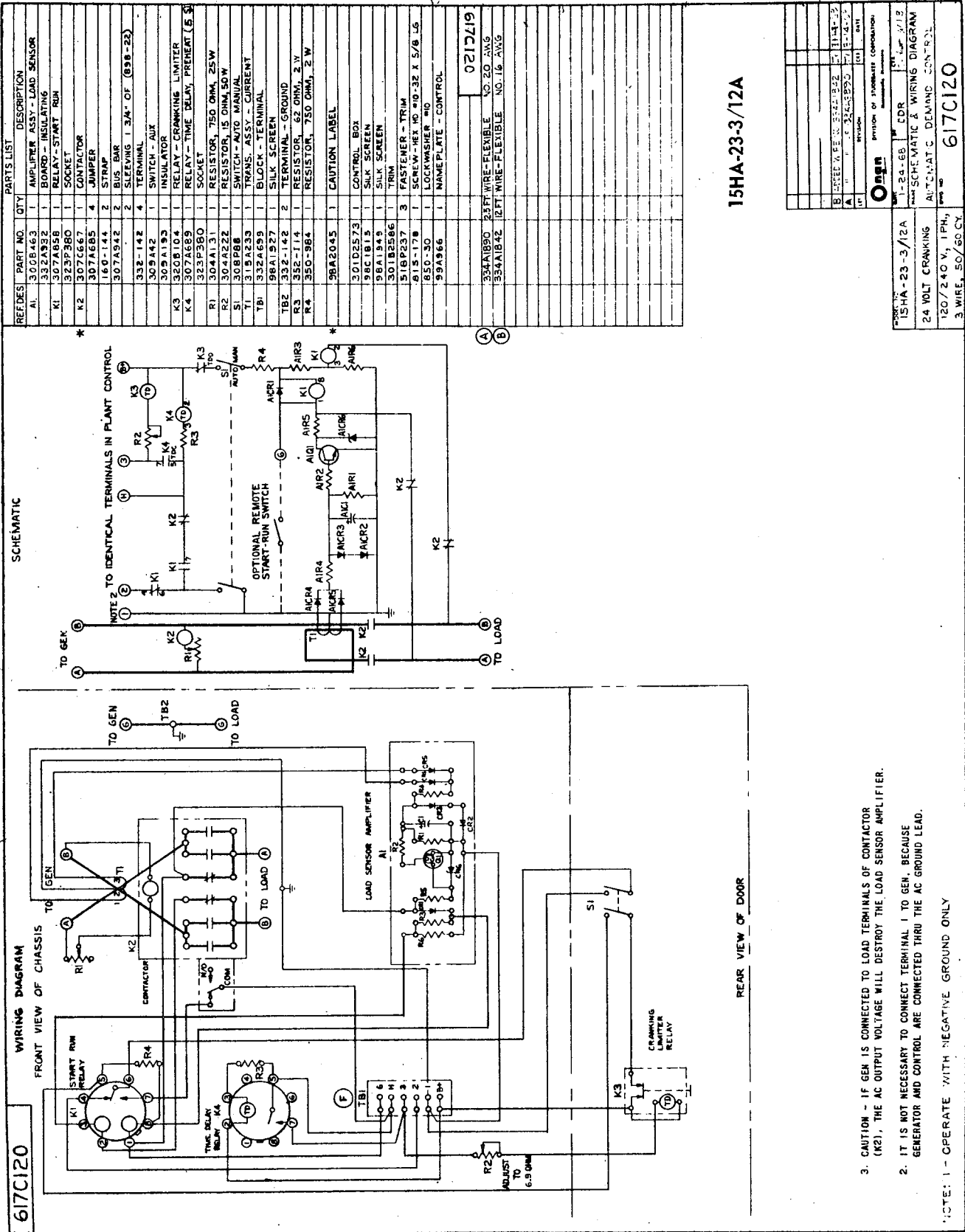
15HA-23-3/1A

3. CAUTION - IF GEN IS CONNECTED TO LOAD TERMINALS OF CONTACTOR (K2), THE AC OUTPUT VOLTAGE WILL DESTROY THE LOAD SENSOR AMPLIFIER.
2. IT IS NOT NECESSARY TO CONNECT TERMINAL 1 TO GEN, BECAUSE GENERATOR AND CONTROL ARE CONNECTED THRU THE AC GROUND LEAD.

NOTE: - OPERATE WITH NEGATIVE GROUND ONLY

15HA-23-3/1A
24 VOLT CRANKING
120/240 V, 1 PH, 3 WIRE, 50/60 CY

1-24-68 CDR
SCHEMATIC & WIRING DIAGRAM
AUTOMATIC DEMAND CONTROL
617C121

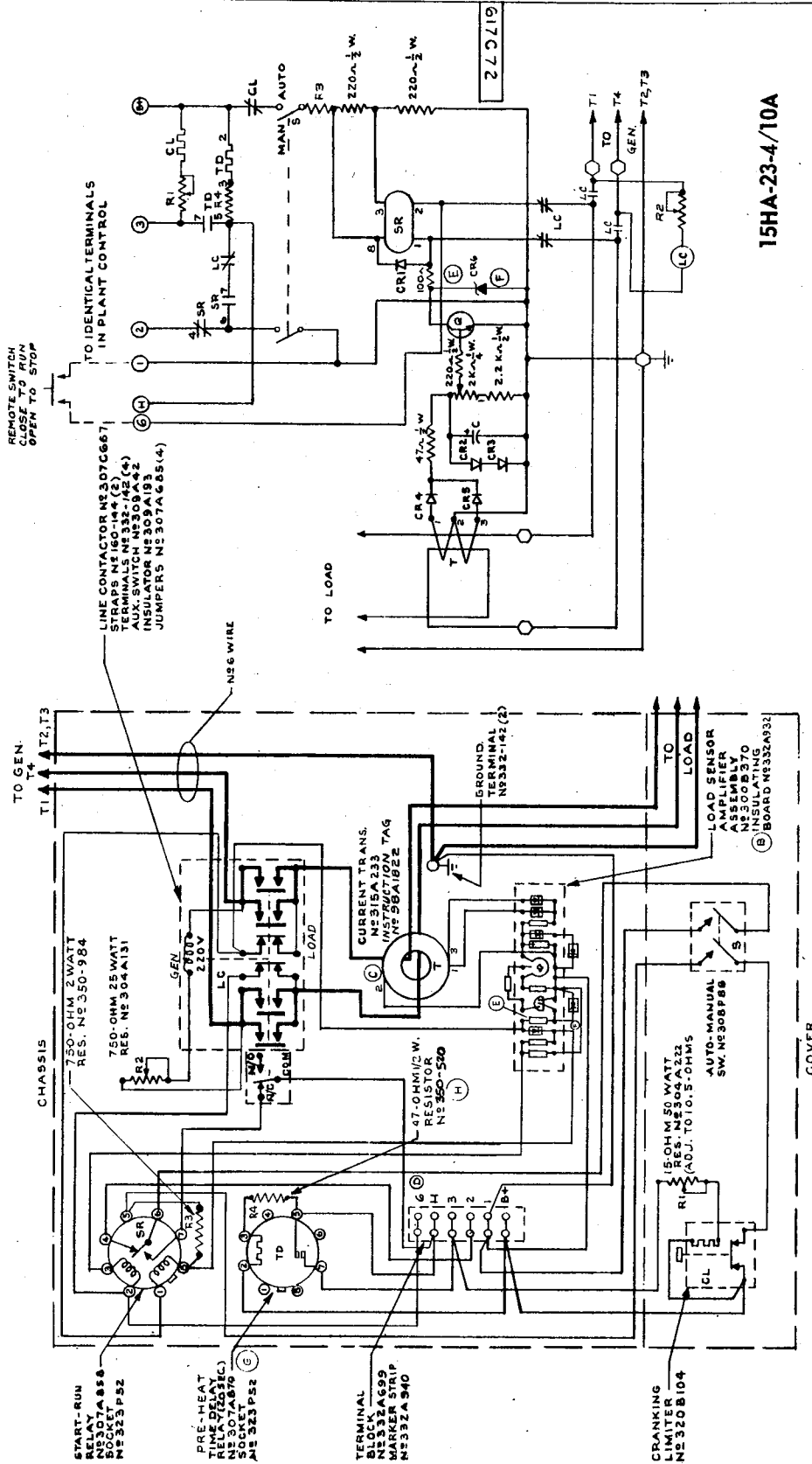


617 C 72

PICTORIAL

SCHEMATIC

15HA-23-4/10A



NOTE:
1- WIRES TO LOAD SENSOR AMPLIFIER N220
OTHER WIRES N220 OR LARGER.

2- OPERATE WITH NEGATIVE GROUND ONLY

15HA-23-4/10A

1	ADDED NOTE 2	15-15-66
2	ADDED NOTE 2	15-15-66
3	ADDED NOTE 2	15-15-66
4	ADDED NOTE 2	15-15-66
5	ADDED NOTE 2	15-15-66
6	ADDED NOTE 2	15-15-66
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15	ADDED NOTE 2	15-15-66
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20	ADDED NOTE 2	15-15-66
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96	ADDED NOTE 2	15-15-66
97	ADDED NOTE 2	15-15-66
98	ADDED NOTE 2	15-15-66
99	ADDED NOTE 2	15-15-66
100	ADDED NOTE 2	15-15-66

MODEL	15HA-23-4/10A
MANUFACTURE	120-240VOLT
CONTROL WIRING DIAGRAM	1PH. 3WIRE 50-60
32 V. CRANKING	617 C 72

**INDEX
FOR
SPEC B CONTROLS**

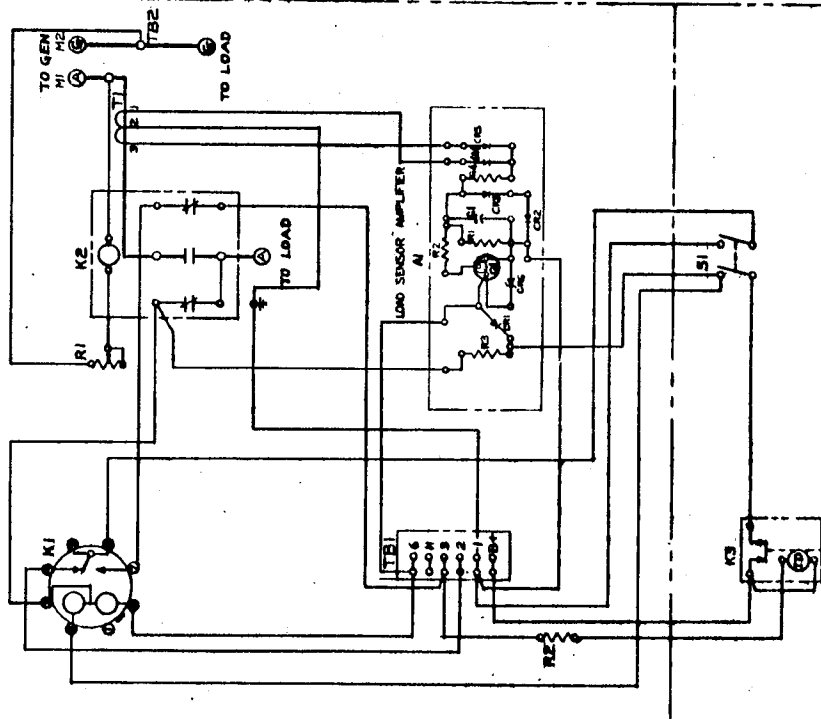
Find the appropriate model and proceed to the indicated page for the wiring diagram.

WATT RATING	MODEL	WIRING DIAGRAM	PAGE
3,500	305HA-21/1	617C90	35
	305HA-21/10	617C91	36
7,500	7.5HA-21/1	617C92	37
	7.5HA-21/10	617C93	38
	7.5HA-21/12	617C94	39
	7.5HA-21/17	617C129	40
	7.5HA-21-4/1	617C113	41
	7.5HA-21-4/10	617C114	42
	7.5HA-22/1	617C95	43
	7.5HA-22/10	617C96	44
	7.5HA-22/12	617C97	45
	7.5HA-23/1	617C102	46
	7.5HA-23/10	617C101	47
	7.5HA-23/12	617C103	48
	7.5HA-23-4/1	617C128	49
	7.5HA-23-4/10	617C111	50
15,000	15.0HA-22/10	617C98	51
	15.0HA-22/12	617C99	52
	15.0HA-23/1	617C100	53
	15.0HA-23/10	617C105	54
	15.0HA-23/12	617C104	55
	15.0HA-23/15	617C116	56
	15.0HA-23/17	617C130	57
	15.0HA-23/18	617C131	58
	15.0HA-23-4/10	617C112	59

617C90

WIRING DIAGRAM

FRONT VIEW OF CHASSIS



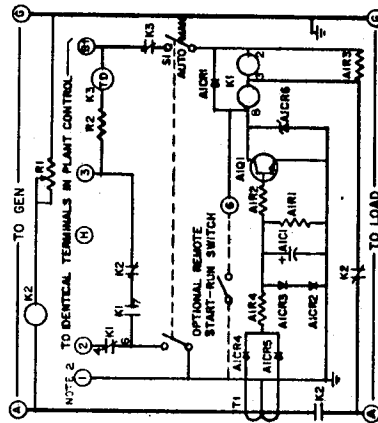
NOTE:

1- OPERATE WITH NEGATIVE GROUND ONLY

2. IT IS NOT NECESSARY TO CONNECT TERMINAL 1 TO GEN, BECAUSE GENERATOR AND CONTROL ARE CONNECTED THRU THE AC GROUND LEAD.

3. CAUTION - IF GEN IS CONNECTED TO LOAD TERMINALS OF CONTACTOR (K2), THE AC OUTPUT VOLTAGE WILL DESTROY THE LOAD SENSOR AMPLIFIER.

SCHEMATIC



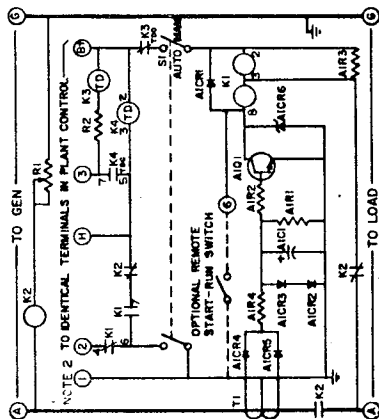
REFDES	PART NO.	QTY	DESCRIPTION
A1	300B437	1	AMPLIFIER ASSY-LOAD SENSOR
K1	300A932	1	BOARD-INSULATING
K2	300A932	1	RELAY-START RUN
K3	300A932	1	RELAY-STOP
R1	300A932	1	RESISTOR-500-OHM, 25W
R2	300A932	1	RESISTOR-3-OHM, 10W
T1	300A932	1	SWITCH-AUTO MANUAL
T2	300A932	1	TRANS-ASSY-CURRENT
T3	300A932	1	BLOCK-TERMINAL
T4	300A932	1	SILK SCREEN
T5	300A932	1	TERMINAL-GROUND
T6	300A932	1	CONTROL BOX
T7	300A932	1	SILK SCREEN
T8	300A932	1	SILK SCREEN
T9	300A932	1	TRIM
T10	300A932	1	FASTENER-TRIM
T11	300A932	1	SCREW-HEX #10-32X1/2
T12	300A932	1	LOCKWASHER #10
T13	300A932	1	NAMEPLATE-CONTROL

305HA-21/1B

C1	MS 3235P2 SOCKET	1	115-9-27
B1	MS 3235P2 SOCKET	1	115-9-27
A1	MS 3235P2 SOCKET	1	115-9-27
A2	MS 3235P2 SOCKET	1	115-9-27
A3	MS 3235P2 SOCKET	1	115-9-27
A4	MS 3235P2 SOCKET	1	115-9-27
A5	MS 3235P2 SOCKET	1	115-9-27
A6	MS 3235P2 SOCKET	1	115-9-27
A7	MS 3235P2 SOCKET	1	115-9-27
A8	MS 3235P2 SOCKET	1	115-9-27
A9	MS 3235P2 SOCKET	1	115-9-27
A10	MS 3235P2 SOCKET	1	115-9-27
A11	MS 3235P2 SOCKET	1	115-9-27
A12	MS 3235P2 SOCKET	1	115-9-27
A13	MS 3235P2 SOCKET	1	115-9-27
A14	MS 3235P2 SOCKET	1	115-9-27
A15	MS 3235P2 SOCKET	1	115-9-27
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A21	MS 3235P2 SOCKET	1	115-9-27
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A24	MS 3235P2 SOCKET	1	115-9-27
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A83	MS 3235P2 SOCKET	1	115-9-27
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A94	MS 3235P2 SOCKET	1	115-9-27
A95	MS 3235P2 SOCKET	1	115-9-27
A96	MS 3235P2 SOCKET	1	115-9-27
A97	MS 3235P2 SOCKET	1	115-9-27
A98	MS 3235P2 SOCKET	1	115-9-27
A99	MS 3235P2 SOCKET	1	115-9-27
A100	MS 3235P2 SOCKET	1	115-9-27

617C90

FRONT VIEW OF CHASSIS



SCHEMATIC

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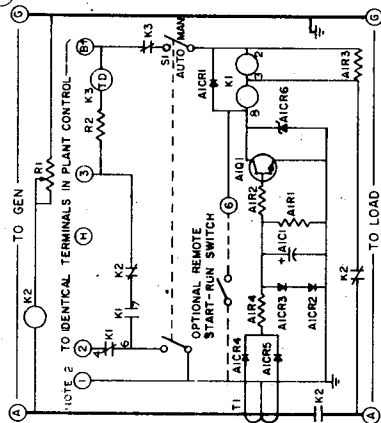
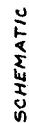
305HA-21/10B

3055 HA-21/108		3055 HA-21/108	
12 VOLT CRANKING		12 VOLT CRANKING	
120V. 1PH.		120V. 1PH.	
2W. 50/60CY.		2W. 50/60CY.	

NOTE:

- NOTE: 1. OPERATE WITH NEGATIVE GROUND ONLY
2. IT IS NOT NECESSARY TO CONNECT TERMINAL 1 TO GEN. BECAUSE GENERATOR AND CONTROL ARE CONNECTED THRU THE AC GROUND LEAD.
3. CAUTION - IF GEN IS CONNECTED TO LOAD TERMINALS OF CONTACTOR (K2) - THE AC INPUT VOLTAGE WILL DESTROY THE LOAD SENSOR AMPLIFIER.
- (B)

FRONT VIEW OF CHASSIS



REF DES	PART NO	QTY	PART'S LIST
A1	300B437	1	AMPLIFIER ASSY-LOAD SENSOR
K1	302A932	1	BOARD - INSULATING
KI	307A62	1	RELAY - START RUN
K2	307P380	1	SOCKET
	307G645	1	CONTACTOR
	332-142	2	TERMINAL
	307A485	2	JUMPER
K3	302B104	1	RELAY-CRANKING LIMITER
R1	98A1045	1	CAUTION LABEL
R2	304A282	1	RESISTOR 300-OHM, 25W
S1	304A132	1	RESISTOR 3-OHM, 10W
T1	308P88	1	SWITCH-AUTO MANUAL
TBI	315A241	1	TRANS ASSY - CURRENT
	332A639	1	BLOCK TERMINAL
	98A1927	1	SILK SCREEN
TB2	332-142	2	TERMINAL-GROUND
	301D2573	1	CONTROL BOX
	98C1815	1	SILK SCREEN
	98A1928	1	SILK SCREEN
	301B2566	1	TRIM
	51BP237	3	FASTER-TRIM
	R15-17B	1	SCREW-HEX HD #10-32x3/8LG
	850-30	1	LOCK WASHER #10
	99A966	1	NAMER PLATE-CONTROL

7.5HA-21/1B

NOTE:

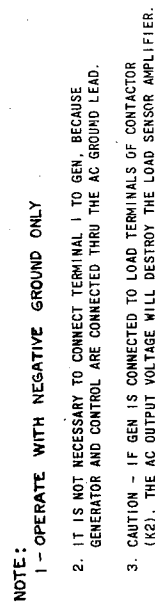
1. - OPERATE WITH NEGATIVE GROUND ONLY
2. IT IS NOT NECESSARY TO CONNECT TERMINAL I TO GEN. BECAUSE GENERATOR AND CONTROL ARE CONNECTED THRU THE AC GROUND LEAD.
3. CAUTION - IF GEN IS CONNECTED TO LOAD TERMINALS OF CONTACTOR (K2). THE AC OUTPUT VOLTAGE WILL DESTROY THE LOAD SENSOR AMPLIFIER.

70	ADDED DASH NO.	71-16-70
71	CUS 32PSP2 ROCKET	71-16-71
72	E PARTS	71-16-72
73	A 2000	71-16-73
74	SPS DNG SAME N° DATED 5-22-66	71-16-74
75	REVISED	71-16-75
76	REVISED	71-16-76
77	REVISED	71-16-77
78	REVISED	71-16-78
79	REVISED	71-16-79
80	REVISED	71-16-80
81	REVISED	71-16-81
82	REVISED	71-16-82
83	REVISED	71-16-83
84	REVISED	71-16-84
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86	REVISED	71-16-86
87	REVISED	71-16-87
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90	REVISED	71-16-90
91	REVISED	71-16-91
92	REVISED	71-16-92
93	REVISED	71-16-93
94	REVISED	71-16-94
95	REVISED	71-16-95
96	REVISED	71-16-96
97	REVISED	71-16-97
98	REVISED	71-16-98
99	REVISED	71-16-99
100	REVISED	71-16-100

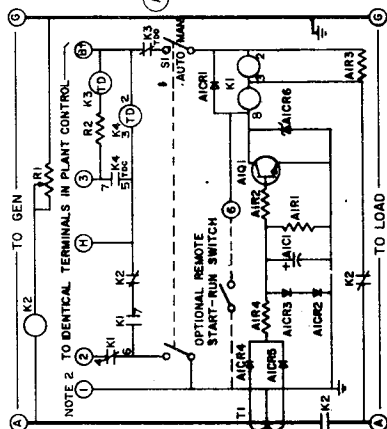
(5)

-01	7.5 HA-21/1B	12 VOLT CRANKING	120V, 1PH, 3W, 50/60CY
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WIRING DIAGRAM
FRONT VIEW OF CHASSIS



DESCRIPTION

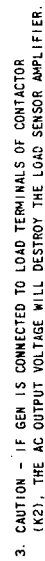
[illegible]

7.5HA-21/10B

[illegible]

7.5 HA-21/10B
112 VOLT CRANKING
120V, 1 PH.,
3W 50/60CY

FRONT VIEW OF CHASSIS



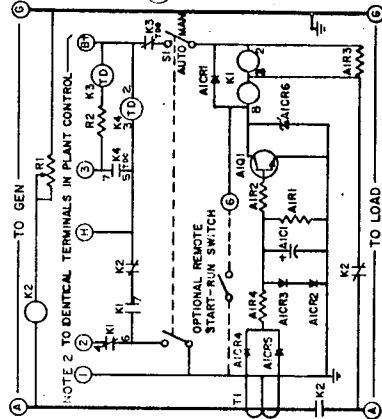
NOTE 2 TO BENTON. TERMINALS IN PLANT CONTROL

OPTIONAL REMOTE START-RUN SWITCH

TO GEN

TO LOAD

Labels in diagram: K1, K2, K3, K4, K5, K6, K7, K8, K9, K10, K11, K12, K13, K14, K15, K16, K17, K18, K19, K20, K21, K22, K23, K24, K25, K26, K27, K28, K29, K30, K31, K32, K33, K34, K35, K36, K37, K38, K39, K40, K41, K42, K43, K44, K45, K46, K47, K48, K49, K50, K51, K52, K53, K54, K55, K56, K57, K58, K59, K60, K61, K62, K63, K64, K65, K66, K67, K68, K69, K70, K71, K72, K73, K74, K75, K76, K77, K78, K79, K80, K81, K82, K83, K84, K85, K86, K87, K88, K89, K90, K91, K92, K93, K94, K95, K96, K97, K98, K99, K100, K101, K102, K103, K104, K105, K106, K107, K108, K109, K110, K111, K112, K113, K114, K115, K116, K117, K118, K119, K120, K121, K122, K123, K124, K125, K126, K127, K128, K129, K130, K131, K132, K133, K134, K135, K136, K137, K138, K139, K140, K141, K142, K143, K144, K145, K146, K147, K148, K149, K150, K151, K152, K153, K154, K155, K156, K157, K158, K159, K160, K161, K162, K163, K164, K165, K166, K167, K168, K169, K170, K171, K172, K173, K174, K175, K176, K177, K178, K179, K180, K181, K182, K183, K184, K185, K186, K187, K188, K189, K190, K191, K192, K193, K194, K195, K196, K197, K198, K199, K200, K201, K202, K203, K204, K205, K206, K207, K208, K209, K210, K211, K212, K213, K214, K215, K216, K217, K218, K219, K220, K221, K222, K223, K224, K225, K226, K227, K228, K229, K230, K231, K232, K233, K234, K235, K236, K237, K238, K239, K240, K241, K242, K243, K244, K245, K246, K247, K248, K249, K250, K251, K252, K253, K254, K255, K256, K257, K258, K259, K260, K261, K262, K263, K264, K265, K266, K267, K268, K269, K270, K271, K272, K273, K274, K275, K276, K277, K278, K279, K280, K281, K282, K283, K284, K285, K286, K287, K288, K289, K290, K291, K292, K293, K294, K295, K296, K297, K298, K299, K300, K301, K302, K303, K304, K305, K306, K307, K308, K309, K310, K311, K312, K313, K314, K315, K316, K317, K318, K319, K320, K321, K322, K323, K324, K325, K326, K327, K328, K329, K330, K331, K332, K333, K334, K335, K336, K337, K338, K339, K340, K341, K342, K343, K344, K345, K346, K347, K348, K349, K350, K351, K352, K353, K354, K355, K356, K357, K358, K359, K360, K361, K362, K363, K364, K365, K366, K367, K368, K369, K370, K371, K372, K373, K374, K375, K376, K377, K378, K379, K380, K381, K382, K383, K384, K385, K386, K387, K388, K389, K390, K391, K392, K393, K394, K395, K396, K397, K398, K399, K400, K401, K402, K403, K404, K405, K406, K407, K408, K409, K410, K411, K412, K413, K414, K415, K416, K417, K418, K419, K420, K421, K422, K423, K424, K425, K426, K427, K428, K429, K430, K431, K432, K433, K434, K435, K436, K437, K438, K439, K440, K441, K442, K443, K444, K445, K446, K447, K448, K449, K450, K451, K452, K453, K454, K455, K456, K457, K458, K459, K460, K461, K462, K463, K464, K465, K466, K467, K468, K469, K470, K471, K472, K473, K474, K475, K476, K477, K478, K479, K480, K481, K482, K483, K484, K485, K486, K487, K488, K489, K490, K491, K492, K493, K494, K495, K496, K497, K498, K499, K500, K501, K502, K503, K504, K505, K506, K507, K508, K509, K510, K511, K512, K513, K514, K515, K516, K517, K518, K519, K520, K521, K522, K523, K524, K525, K526, K527, K528, K529, K530, K531, K532, K533, K534, K535, K536, K537, K538, K539, K540, K541, K542, K543, K544, K545, K546, K547, K548, K549, K550, K551, K552, K553, K554, K555, K556, K557, K558, K559, K560, K561, K562, K563, K564, K565, K566, K567, K568, K569, K570, K571, K572, K573, K574, K575, K576, K577, K578, K579, K580, K581, K582, K583, K584, K585, K586, K587, K588, K589, K590, K591, K592, K593, K594, K595, K596, K597, K598, K599, K600, K601, K602, K603, K604, K605, K606, K607, K608, K609, K610, K611, K612, K613, K614, K615, K616, K617, K618, K619, K620, K621, K622, K623, K624, K625, K626, K627, K628, K629, K630, K631, K632, K633, K634, K635, K636, K637, K638, K639, K640, K641, K642, K643, K644, K645, K646, K647, K648, K649, K650, K651, K652, K653, K654, K655, K656, K657, K658, K659, K660, K661, K662, K663, K664, K665, K666, K667, K668, K669, K670, K671, K672, K673, K674, K675, K676, K677, K678, K679, K680, K681, K682, K683, K684, K685, K686, K687, K688, K689, K690, K691, K692, K693, K694, K695, K696, K697, K698, K699, K700, K701, K702, K703, K704, K705, K706, K707, K708, K709, K710, K711, K712, K713, K714, K715, K716, K717, K718, K719, K720, K721, K722, K723, K724, K725, K726, K727, K728, K729, K730, K731, K732, K733, K734, K735, K736, K737, K738, K739, K740, K741, K742, K743, K744, K745, K746, K747, K748, K749, K750, K751, K752, K753, K754, K755, K756, K757, K758, K759, K760, K761, K762, K763, K764, K765, K766, K767, K768, K769, K770, K771, K772, K773, K774, K775, K776, K777, K778, K779, K780, K781, K782, K783, K784, K785, K786, K787, K788, K789, K790, K7



REF DES	PART NO.	QTY	PARTS LIST	DESCRIPTION
A	300A437	1	AMPLIFIER ASSY-LOAD SENSOR	
	324A932	1	BOARD-INSULATING	
K1	307A162	1	RELAY-START RUN	
	323P380	1	SOCKET	
K2	307C665	1	CONTACTOR	
	332-142	2	TERMINAL	
	307A685	2	JUMPER	
K3	320B104	1	RELAY-CRANKING LIMITER	
K4	307A669	1	RELAY-TIME DELAY-START/46(55)	
	323P380	1	SOCKET	
R1	304A282	1	RESISTOR 300-OHM 25W	
R2	304A192	1	FESISTOR 3-OHM 10W	
S1	308P56	1	SWITCH-AUTO MANUAL	
T1	315A24	1	TRANS-ASSY-CURRENT	
TB1	132A699	1	BLOCK-TERMINAL	
	98A1927	1	SILK SCREEN	
TB2	332-142	2	TERMINAL-GROUND	
	98A2045	1	CAUTION LABEL	
	301D2573	1	CONTROL BOX	
	96C1815	1	SILK SCREEN	
	98A1928	1	SILK SCREEN	
	301B2586	1	TRIM	
	518P237	3	FASTENER-TRIM	
	815-178	1	SCREW-HEX HD #6-32X1/16	
	850-30	1	LOCKWASHER #10	
	99A966	1	NAMEPLATE-CONTROL	

7.5HA-21/12B

D	WAS 325-52	SCOVET	1	3	2
C	1	1	1	1	1
B	1	1	1	1	1
A	1	1	1	1	1

SUPPLIES DATE SHIP NO DATED 8-23-66

LT	EXTENSION	(M)	DATE
<div> <div>○</div> <div>0 0 0 0 0 0</div> </div>			
<div> <div>EXTENSION OF FIBERGLASS CONDUIT</div> <div>FOR ELECTRICAL WIRING</div> </div>			
EXT	124-67	CC	10-17-68

SCHEMATIC & WIRING DIAGRAM
AUTOMATIC DEMAND CONTROL

617C94

120V, 1PH.
2W., 50/60CY.

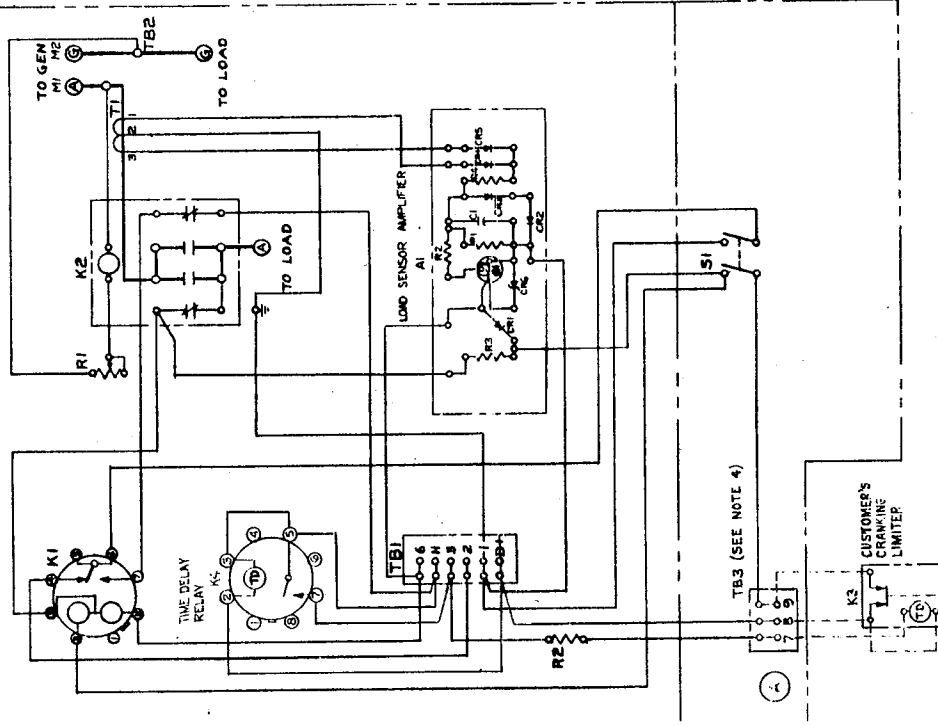
12 VOLT CRANKING

7.5HA-21/12B

617C129

WIRING DIAGRAM

FRONT VIEW OF CHASSIS



NOTE:

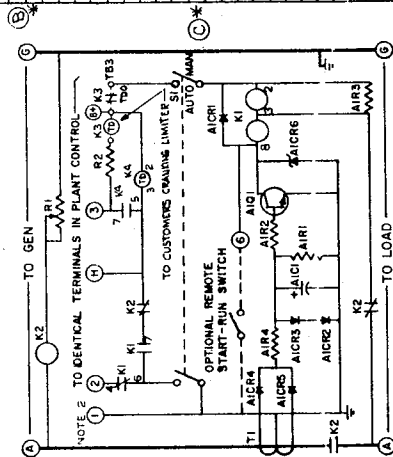
1- OPERATE WITH NEGATIVE GROUND ONLY

2. IT IS NOT NECESSARY TO CONNECT TERMINAL 1 TO GEN. BECAUSE GENERATOR AND CONTROL ARE CONNECTED THRU THE AC GROUND LEAD.

3. CAUTION - IF GEN IS CONNECTED TO LOAD TERMINALS OF CONTACTOR (K2), THE AC OUTPUT VOLTAGE WILL DESTROY THE LOAD SENSOR AMPLIFIER.

4. PAINT BACK OF MARKER STRIP WHITE, BEFORE MOUNTING IT IN BOX.

SCHEMATIC



617C129

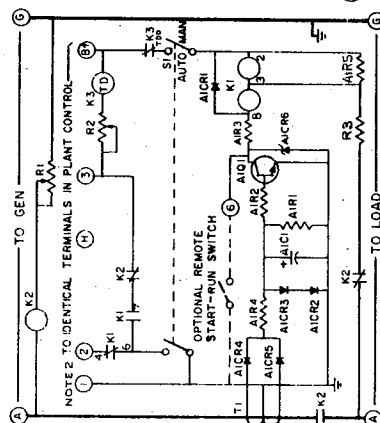
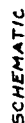
7.5HA-21/17B

REFDES	PART NO	QTY	DESCRIPTION
A1	300B437	1	AMPLIFIER ASSY-LOAD SENSOR
K1	332A932	1	BOARD-INSULATING
K2	307A62	1	RELAY-START RUN
	329P380	1	SOCKET
	307C665	1	CONTACTOR
	332-142	2	TERMINAL
	307A685	2	JUMPER
	98A2045	1	CAUTION LABEL
K3	32CB047EP	1	RELAY-CRANKING LIMITER
K4	307A645	1	RELAY-TIME DELAY PREHEAT (25S)
R1	304A282	1	RESISTOR 300-OHM/25W
R2	304A192	1	RESISTOR 3-OHM/10W
S1	308P88	1	SWITCH-AUTO MANUAL
T1	315A241	1	TRANS ASSY-CURRENT
TB1	332A699	1	BLOCK-TERMINAL
	98A1927	1	SILK SCREEN
TB2	332-142	2	TERMINAL-GROUND
TB3	332A611	1	BLOCK-TERMINAL
	332A612	1	STRIP-MARKER (SEE NOTE 4)
	323P380	1	SOCKET
	301DE573	1	CONTROL BOX (MODIFY)
	98C1815	1	SILK SCREEN
	98A1528	1	SILK SCREEN
	301B256	1	TRIM
	518P237	3	FASTENER-TRIM
	815-178	1	SCREW-HEX HD#10-32X1/8
	850-30	1	LOCKWASHER #10
	59A966	1	NAMEPLATE-CONTROL

7.5HA-21/17B
12 VOLT CRANKING
120V₂ 1PH₂
2W₂ 50/60CY

617C129

FRONT VIEW OF CHASSIS



7.5HA-21-4/1B

1. OPERATE WITH NEGATIVE GROUND ONLY.

- | | | | |
|----|---|-------------------------|---------|
| 11 | A | ADDED WIRE NO 334A 2842 | 7-12-63 |
| 10 | E | ADDED WIRE NO 334A 2842 | 7-11-63 |
| 9 | D | " " 334A 2842 | 7-4-63 |
| 8 | C | " " 334A 2842 | 7-4-63 |
| 7 | B | ADDED WIRE NO 334A 2842 | 7-11-63 |
| 6 | A | ADDED WIRE NO 334A 2842 | 7-11-63 |

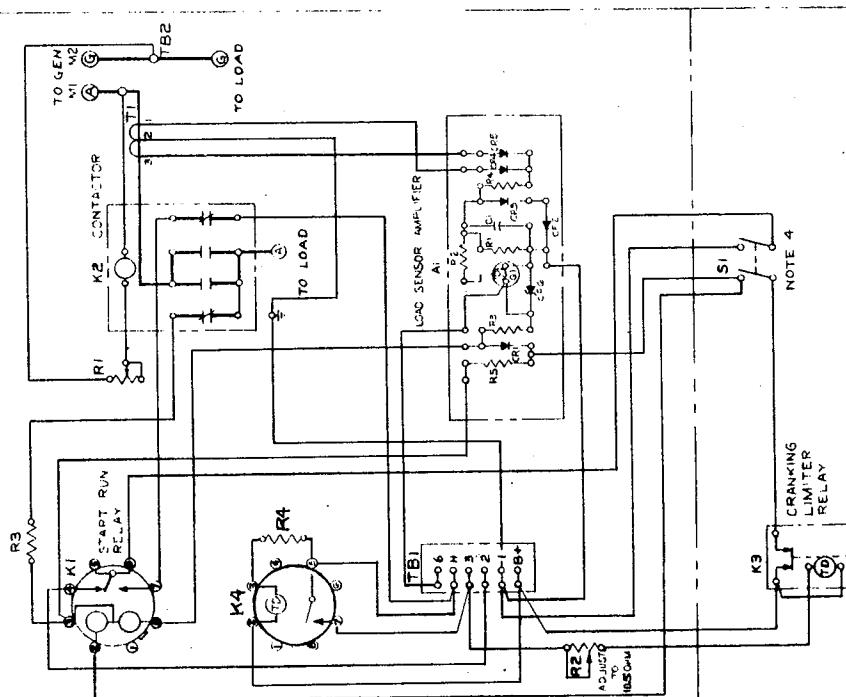
Origin

7.5NA-21-4/18
32 VOLT CRANKING
120 V, 1 PH.
2W, 50/60 CY.

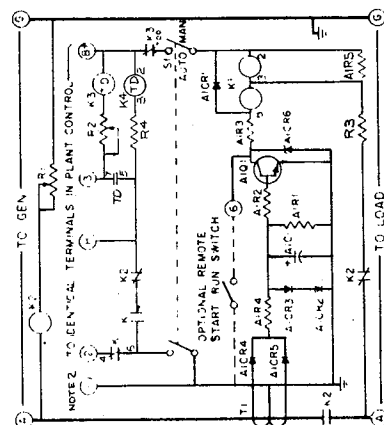
617C113

WIRING DIAGRAM

FRONT VIEW OF CHASSIS



SCHEMATIC



REF ID	WV	WV	PARTS LIST	DESCRIPTION
A1	300B45E	1	AMPLIFIER ASSY-LOAD SENSOR	
A2	302A332	1	BOARD-INSULATING	
A3	307A62	1	RELAY-START RUN	
A4	303P360	1	SOCKET	
A5	307C665	1	CONTACTOR	
A6	332-42	1	TERMINAL	
A7	307-685	1	JUMPER	
A8	320B104	1	RELAY-CRANKING LIMITER	
A9	307A579	1	RELAY-TIME DELAY 20 SEC	
A10	350-520	1	RESISTOR-470H 1/2 W	
A11	304A266	1	RESISTOR-300-0HM 1/2 W	
A12	304A222	1	RESISTOR-15-0HM 1/2 W	
A13	308P688	1	SWITCH-AUTO MANUAL	
A14	315A241	1	TRANS-AUTO CURRENT	
A15	332A699	1	BLOCK-TERMINAL	
A16	98A1927	1	SILK SCREEN	
A17	332-142	1	TERMINAL-GROUND	
A18	304A520	1	RESISTOR-30-0HM 1/2 W	
A19	301D2573	1	CONTROL BOX	
A20	98C1815	1	SILK SCREEN	
A21	98A1957	1	SILK SCREEN	
A22	301B2566	1	TRIM	
A23	51B2327	3	FASTENER-TRIM	
A24	615-170	1	SCREW-HEX HD #0-32X3/16	
A25	850-30	1	LOCKWASHER #10	
A26	98A9566	1	NAMED PLATE-CONTROL	
A27	98A2645	1	LABEL-CONTROL	
A28	334A1890	25 FT	WIRE-#14/5E	NO. 20 AWG
A29	334A1642	12 FT	WIRE-#14/5E	NO. 16 AWG
A30	717C111	1		

7.5HA-21-4/10B

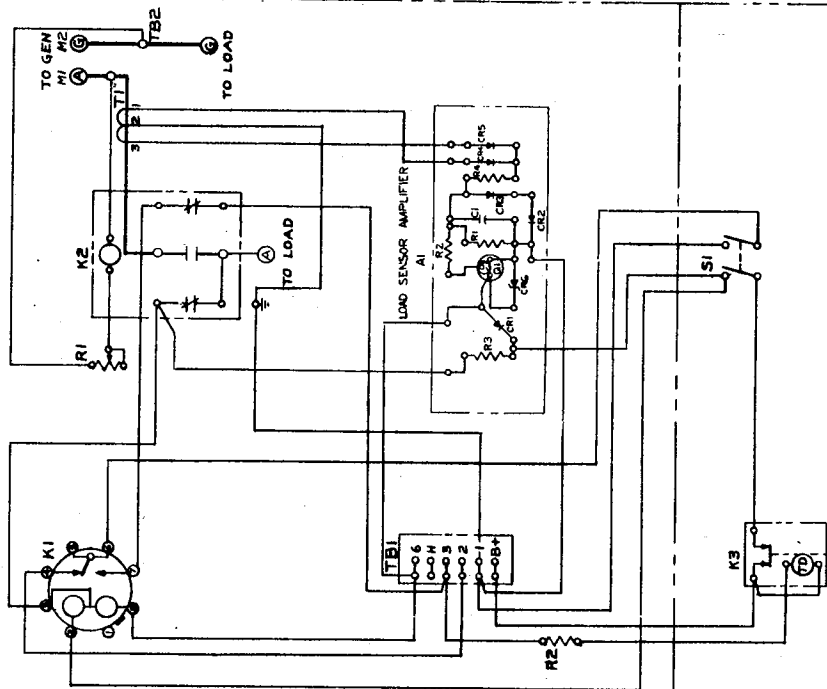
[illegible]

1. OPERATE WITH NEGATIVE GROUND ONLY.
2. IT IS NECESSARY TO CONNECT TERMINAL 1 TO GEN. BECAUSE GENERATOR AND CONTROL ARE CONNECTED THRU THE AC GROUND LEAD.
3. CAUTION - IF GEN IS CONNECTED TO LOAD TERMINALS OF CONTACTOR (K2), THE AC OUTPUT VOLTAGE WILL DESTROY THE LOAD SENSOR AMPLIFIER.
4. MOUNT SWITCH WITH FINISHING NUT ON THE FRONT PANEL.

617C95

WIRING DIAGRAM

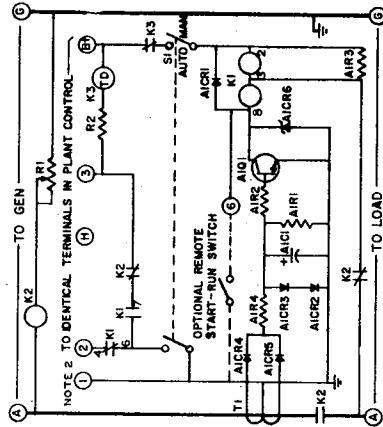
FRONT VIEW OF CHASSIS



NOTE:

- 1 - OPERATE WITH NEGATIVE GROUND ONLY
2. IT IS NOT NECESSARY TO CONNECT TERMINAL 1 TO GEN, BECAUSE GENERATOR AND CONTROL ARE CONNECTED THRU THE AC GROUND LEAD.
3. CAUTION - IF GEN IS CONNECTED TO LOAD TERMINALS OF CONTACTOR (K2), THE AC OUTPUT VOLTAGE WILL DESTROY THE LOAD SENSOR AMPLIFIER.

SCHEMATIC



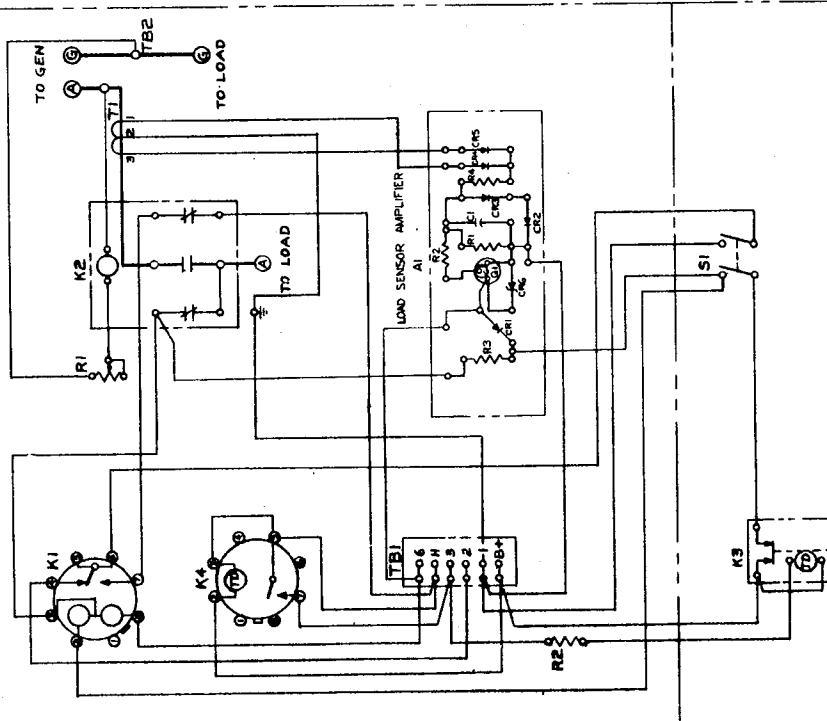
REF ID	PART NO.	QTY	DESCRIPTION
A1	300B443	1	AMPLIFIER ASSY-LOAD SENSOR
	332A932	1	BOARD-INSULATING
K1	307A62	1	RELAY-START RUN
	323P380	1	SOCKET
K2	307L664	1	CONTACTOR
	332-517	2	TERMINAL
	98A2045	1	CAUTION LABEL
K3	320B104	1	RELAY-CRANKING LIMITER
	304A131	1	RESISTOR-750-OHM, 25W
R2	304A192	1	RESISTOR-3-OHM, 10W
S1	308P88	1	SWITCH-AUTO MANUAL
T1	315A241	1	TRANS-ASSY-CURRENT
TB1	332A699	1	BLOCK-TERMINAL
	98A1927	1	SILK SCREEN
TB2	332-517	2	TERMINAL-GROUND
	301D2573	1	CONTROL BOX
	98A1815	1	SILK SCREEN
	98A1528	1	SILK SCREEN
	301B2586	1	TRIM
	518P237	3	FASTENER-TRIM
	815-178	1	SCREW-HEX HD #8-32X1/4
	850-30	1	LOCKWASHER #10
	99A966	1	NAMEPLATE-CONTROL

7.5HA-22/1B

DATE	11-9-67
BY	11-9-67
REVISION	11-9-67
1	11-9-67
2	11-9-67
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76	11-9-67
77	11-9-67
78	11-9-67
79	11-9-67
80	11-9-67
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86	11-9-67
87	11-9-67
88	11-9-67
89	11-9-67
90	11-9-67
91	11-9-67
92	11-9-67
93	11-9-67
94	11-9-67
95	11-9-67
96	11-9-67
97	11-9-67
98	11-9-67
99	11-9-67
100	11-9-67

617C95

FRONT VIEW OF CHASSIS



NOTE: 1 - OPERATE WITH NEGATIVE GROUND ONLY

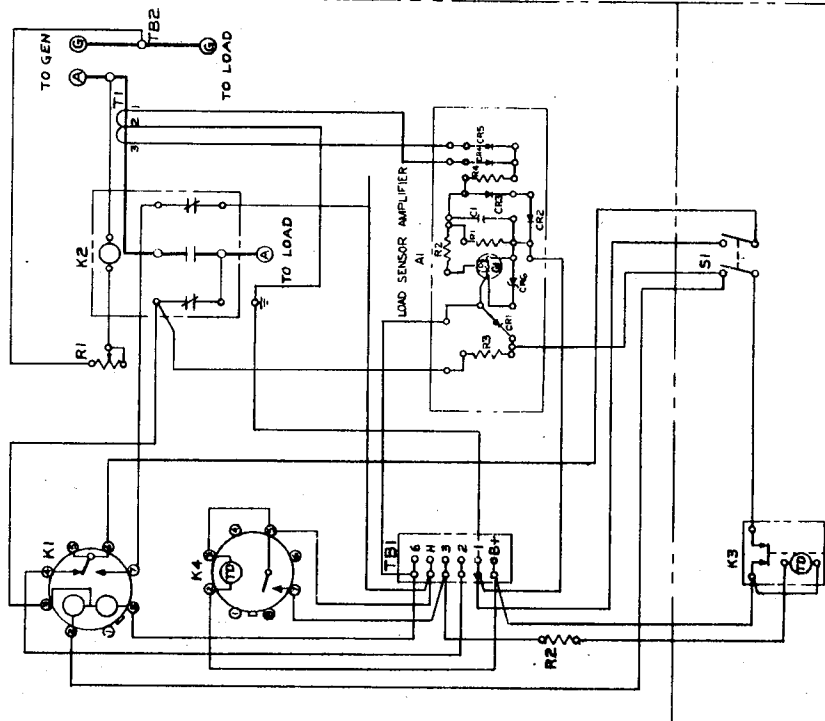
2. IT IS NOT NECESSARY TO CONNECT TERMINAL 1 TO GEN. BECAUSE GENERATOR AND CONTROL ARE CONNECTED THRU THE AC GROUND LEAD.
3. CAUTION - IF GEN IS CONNECTED TO LOAD TERMINALS OF CONTACTOR (K2). THE AC OUTPUT VOLTAGE WILL DESTROY THE LOAD SENSOR AMPLIFIER.

[illegible][illegible]

7.5HA-22/10B

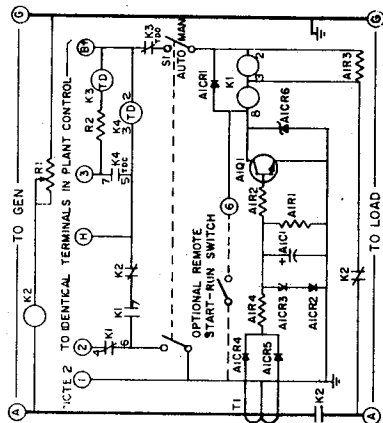
DATE	NO	7.5-HA-22/10B
TIME	12	12 VOLT CRANKING
TESTER	1PH	240V, 1PH
TESTER	2W	2W, 50/60CY.

FRONT VIEW OF CHASSIS



3. CAUTION - IF GEN IS CONNECTED TO LOAD TERMINALS OF CONTACTOR (K2), THE AC OUTPUT VOLTAGE WILL DESTROY THE LOAD SENSOR AMPLIFIER.

PART 5 LIST

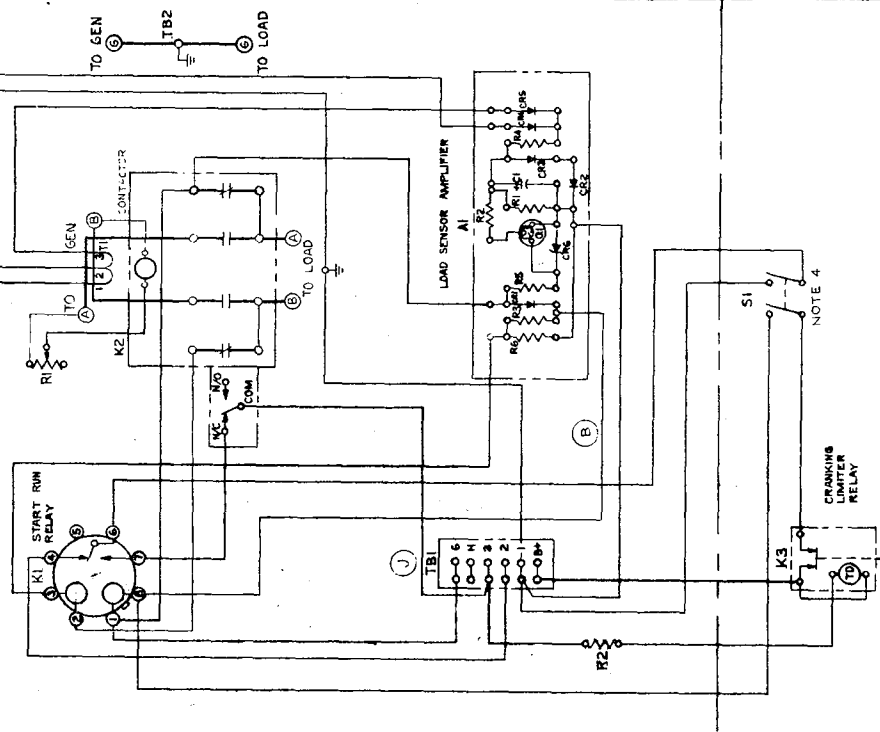


REF DES	PART NO.	QTY	PARTS LIST
A1	300B443	1	AMPLIFIER ASSY-LOAD SENSOR
K1	332A932	1	BOARD - INSULATING
K1	307A62	1	RELAY - START RUN
K2	323P380	1	SOCKET
K2	307C664	1	CONTACTOR
K3	332-517	2	TERMINAL
K4	98A2045	1	CANTON LABEL
K4	320B104	1	RELAY-CRANKING LIMITER
K4	307A689	1	RELAY-TIME DELAY STARTING(S)
R1	323P380	1	SOCKET
R1	304A731	1	RESISTOR .750-OHM .25W
R2	304A192	1	RESISTOR 3 OHM .10 W
S1	306PB8	1	SWITCH-AUTO MANUAL
T1	315A24	1	TRANS. ASSY - CURRENT
TB1	332A629	1	BLOCK TERMINAL
TB2	98A1927	1	SILK SCREEN
TB2	332-517	2	TERMINAL-GROUND
	301D2573	1	CONTROL BOX
	98C1815	1	SILK SCREEN
	98A1928	1	SILK SCREEN
	301B586	1	TRIM
	518P237	3	FASENER- TRIM
	815-178	1	SCREW-HEX HD #8-32x3/16 L
	850-30	1	LOCK WASHER #10
	99A966	1	NAMEPLATE-CONTROL
			617C927

7.5HA-22/12B

D	WAS 323P52 SECRET	25	11-3-47
E	COPIED NOTES 2 & 3	25	11-31-47
F	COPIED NOTES 4 & 5	10	31-47
G	COPIED ALL 98-2045	10	31-47
H	COPIED ALL 98-2045	10	31-47
I	COPIED ALL 98-2045	10	31-47
J	COPIED ALL 98-2045	10	31-47
K	COPIED ALL 98-2045	10	31-47
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U	COPIED ALL 98-2045	10	31-47
V	COPIED ALL 98-2045	10	31-47
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BC	COPIED ALL 98-2045	10	31-47
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GN	COPIED ALL 98-2045	10	31-47

617C102

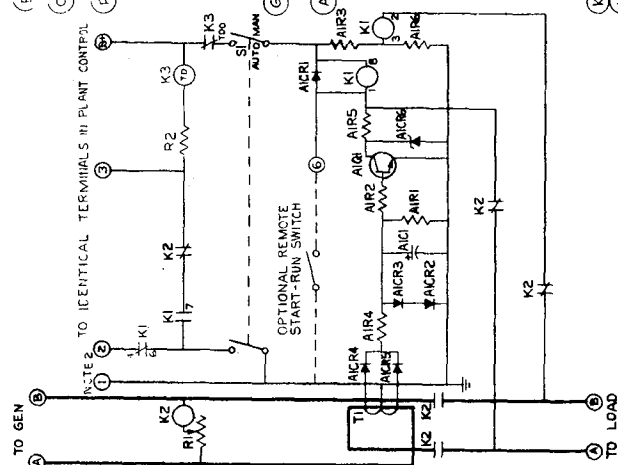
WIRING DIAGRAM
FRONT VIEW OF CHASSIS

REAR VIEW OF DOOR

- (H) 4. MOUNT SWITCH WITH FINISHING NUT ON THE FRONT PANEL.
- (I) 3. CAUTION - IF GEN IS CONNECTED TO LOAD TERMINALS OF CONTACTOR (K2), THE AC OUTPUT VOLTAGE WILL DESTROY THE LOAD SENSOR AMPLIFIER.
- (D) 2. IT IS NOT NECESSARY TO CONNECT TERMINAL 1 TO GEN, BECAUSE GENERATOR AND CONTROL ARE CONNECTED THRU THE AC GROUND LEAD.

NOTE: 1-OPERATE WITH NEGATIVE GROUND ONLY

SCHEMATIC



PARTS LIST

REF DES	PART NO	QTY	DESCRIPTION
A1	300B463	1	AMPLIFIER ASSY - LOAD SENSOR
	332A332	1	BOARD - INSULATING
K1	307A858	1	RELAY - START RUN
	323P350	1	SOCKET
K2	307C664	1	CONTACTOR
	98A2045	1	CAUTION LABEL
	160-144	2	STRAP
	332-117	4	TERMINAL
	309A442	1	SWITCH - AUX
	309A193	1	INSULATOR
K3	320B104	1	RELAY - CRANKING LIMITER
	304A131	1	RESISTOR, 750 OHM, 25W
R2	304A132	1	RESISTOR, 3 OHM, 10W
S1	308P88	1	SWITCH - AUTO MANUAL
T1	315A231	1	TRANS. ASSY - CURRENT
TB1	332A659	1	BLOCK - TERMINAL
	98A1927	1	SILK SCREEN
TB2	332-517	2	TERMINAL - GROUND
	301D2573	1	CONTROL BOX
	98C1915	1	SILK SCREEN
	98C1919	1	SILK SCREEN
	301B2586	1	TRIM
	518P237	3	FASTENER - TRIM
	858-1198	1	SCREW - HEX HD #10-32 X 5/8 LG
	850-30	1	LOCKWASHER #10
	59A966	1	NAMEPLATE - CONTROL
	334A1890	25FT	WIRE-FLEXIBLE NO.20 AWG
	334A1842	12FT	WIRE-FLEXIBLE NO.16 AWG
	201C119		

7.5HA-23/1B

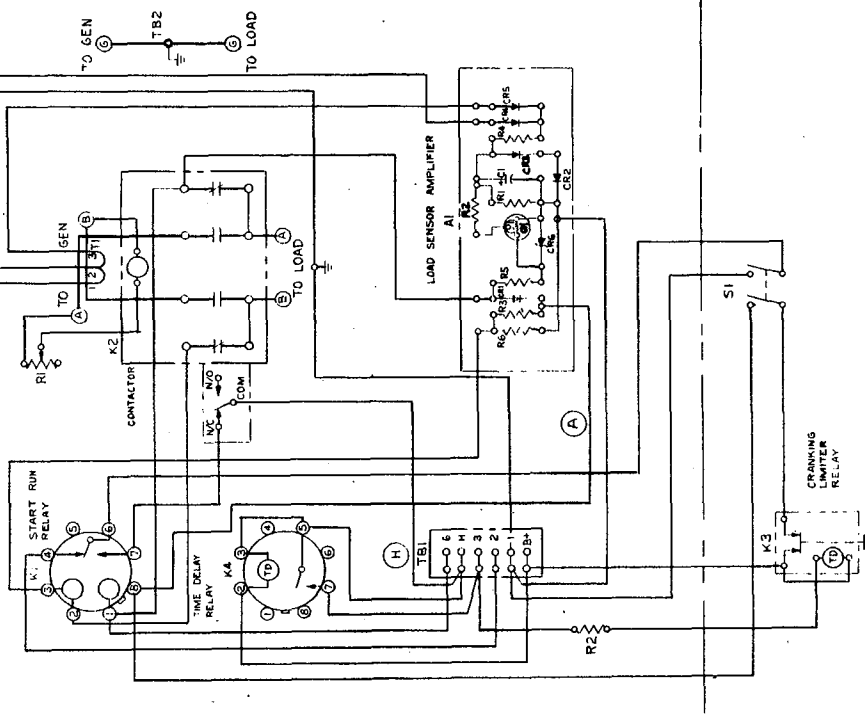
L	ADDED WIRE NO 334A1842 12FT	NO 16 AWG
K	" " " 334A1890 25FT	NO 20 AWG
J	REV WIRING TERMINAL 617C102-24-68	
H	ADDED NOTE 4	27 DE 11-13-67
G	WAS 315A233	27 DE 11-13-67
F	307A858 PARTO REMOVED	27 DE 11-13-67
E	WAS 323P350 SOCKET	27 DE 11-13-67
D	ADDED NOTES 2 & 3	27 DE 11-13-67
C	ADDED LABEL 98A2045	27 DE 11-13-67
B	ADDED LEAD 51 TO K1	27 DE 11-13-67
A	WAS 332-142	27 DE 11-13-67
REV	REVISION	DATE
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100	100	100

PROJECT	7.5HA-23/1B	REV	12-29-66	CDR	27A	WJB
WIRING	SCHEMATIC 2	WIRING	DIAGRAM			
12 VOLT CRANKING						
120/240 V, 1PH, 3 WIRE, 50/60 CY.						
617C102						

617C101

WIRING DIAGRAM

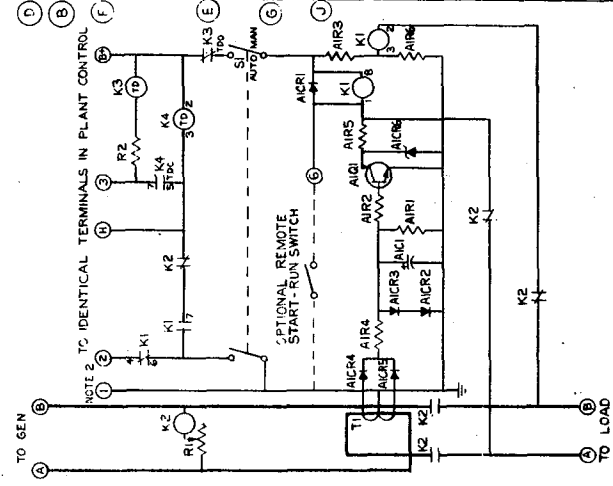
FRONT VIEW OF CHASSIS



REAR VIEW OF DOOR

3. CAUTION - IF GEN IS CONNECTED TO LOAD TERMINALS OF CONTACTOR (K2), THE AC OUTPUT VOLTAGE WILL DESTROY THE LOAD SENSOR AMPLIFIER.
 2. IT IS NOT NECESSARY TO CONNECT TERMINAL 1 TO GEN, BECAUSE GENERATOR AND CONTROL ARE CONNECTED THRU THE AC GROUND LEAD
- NOTE: 1 - OPERATE WITH NEGATIVE GROUND ONLY

SCHEMATIC



PARTS LIST

REFDES	PART NO	QTY	DESCRIPTION
A1	3505463	1	AMPLIFIER ASSY - LOAD SENSOR
K1	322A332	1	BOARD - INSULATING
K2	307A656	1	RELAY - START RUN
K3	323P380	1	CONTACTOR
K4	307C666	1	CAUTION LABEL
R1	307A2045	1	CAUTION STRAP
R2	160-144	2	STRAP
R3	332-117	4	TERMINAL
R4	309A442	1	SWITCH - AUX
R5	309A193	1	INSULATOR
R6	320B104	1	RELAY - CRANKING LIMITER
R7	307A645	1	RELAY - TIME DELAY, PREHEAT (20S)
R8	323P380	1	SOCKET
R9	304A131	1	RESISTOR, 750 OHM, 25W
R10	304A192	1	RESISTOR, 3 OHM, 10W
R11	308P88	1	SWITCH - AUTO MANUAL
R12	315A291	1	TRANS. ASSY - CURRENT
R13	332A699	1	BLOCK - TERMINAL
R14	98A1927	1	SILK SCREEN
R15	332-517	2	TERMINAL - GROUND
R16	301D2573	1	CONTROL BOX
R17	98C1815	1	SILK SCREEN
R18	98A1549	1	SILK SCREEN
R19	301B2586	1	TRIM
R20	518P237	3	FASTENER - TRIM
R21	615-178	1	SCREW - HEX HD #10-32 X 5/8 LG
R22	650-30	1	LOCKWASHER #10
R23	99A966	1	NAMEPLATE - CONTROL

7.5HA-23/10B

J1E2 WAS 332-142	2-20-68
K1 RELAY - TERMINAL 6	2-20-68
K2 RELAY - TERMINAL 6	2-20-68
K3 RELAY - TERMINAL 6	2-20-68
K4 RELAY - TERMINAL 6	2-20-68
K5 RELAY - TERMINAL 6	2-20-68
K6 RELAY - TERMINAL 6	2-20-68
K7 RELAY - TERMINAL 6	2-20-68
K8 RELAY - TERMINAL 6	2-20-68
K9 RELAY - TERMINAL 6	2-20-68
K10 RELAY - TERMINAL 6	2-20-68
K11 RELAY - TERMINAL 6	2-20-68
K12 RELAY - TERMINAL 6	2-20-68
K13 RELAY - TERMINAL 6	2-20-68
K14 RELAY - TERMINAL 6	2-20-68
K15 RELAY - TERMINAL 6	2-20-68
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K18 RELAY - TERMINAL 6	2-20-68
K19 RELAY - TERMINAL 6	2-20-68
K20 RELAY - TERMINAL 6	2-20-68
K21 RELAY - TERMINAL 6	2-20-68
K22 RELAY - TERMINAL 6	2-20-68
K23 RELAY - TERMINAL 6	2-20-68
K24 RELAY - TERMINAL 6	2-20-68
K25 RELAY - TERMINAL 6	2-20-68
K26 RELAY - TERMINAL 6	2-20-68
K27 RELAY - TERMINAL 6	2-20-68
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K29 RELAY - TERMINAL 6	2-20-68
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K33 RELAY - TERMINAL 6	2-20-68
K34 RELAY - TERMINAL 6	2-20-68
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K36 RELAY - TERMINAL 6	2-20-68
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K97 RELAY - TERMINAL 6	2-20-68
K98 RELAY - TERMINAL 6	2-20-68
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K100 RELAY - TERMINAL 6	2-20-68

7.5HA-23/10B

CDR

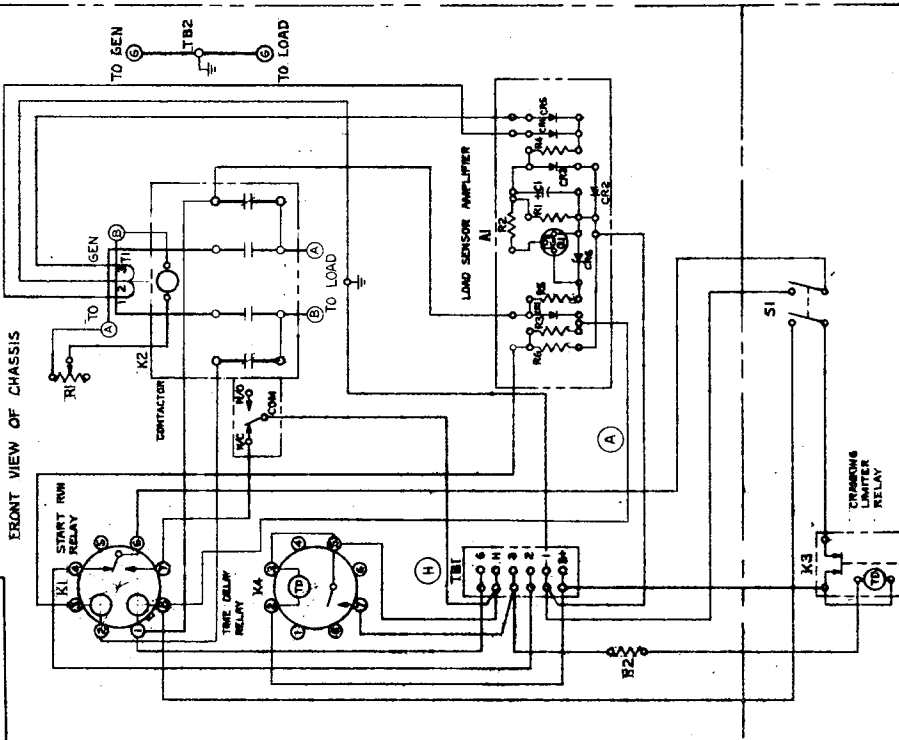
SCHEMATIC & WIRING DIAGRAM

617C101

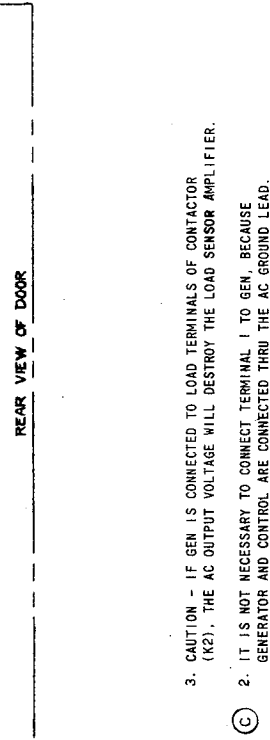
617C103

WIRING DIAGRAM

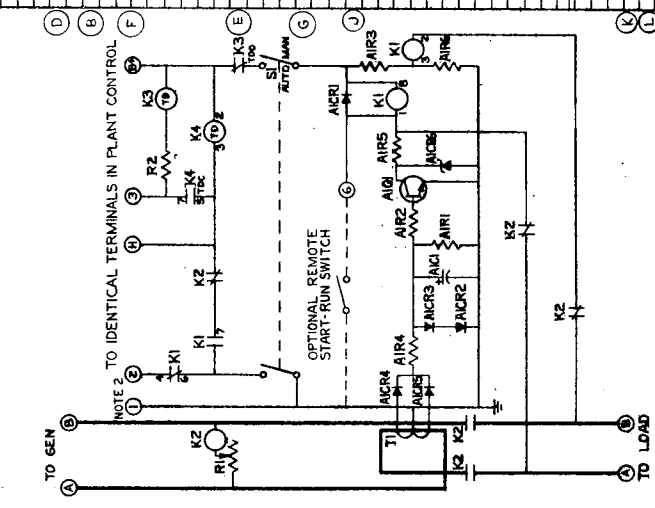
FRONT VIEW OF CHASSIS



REAR VIEW OF DOOR



SCHEMATIC



REF DES	PART NO.	QTY	DESCRIPTION
A1	300B463	1	AMPLIFIER ASSY - LOAD SENSOR
K1	332A932	1	BOARD - INSULATING
K1	307A658	1	RELAY - START RUN
K2	323P 380	1	SOCKET
K2	307C666	1	CONTACTOR
K4	98A2045	1	CAUTION LABEL
	160-144	2	STRAP
	332-517	4	TERMINAL
	309A42	1	SWITCH - AUX
	309A183	1	INSULATOR
K3	320B104	1	RELAY - CRANKING LIMITER
K4	307A689	1	RELAY - TIME DELAY, PREHEAT (5
R1	323P380	1	SOCKET
R1	304A131	1	RESISTOR, 750 OHM, 25W
R2	304A192	1	RESISTOR, 3 OHM, 10W
S1	308P88	1	SWITCH - AUTO MANUAL
T1	315A291	1	TRANS. ASSY - CURRENT
TB1	332A699	1	BLOCK - TERMINAL
	98A1927	1	SILK SCREEN
TB2	332-517	2	TERMINAL - GROUND
	301D2573	1	CONTROL BOX
	98C1815	1	SILK SCREEN
	98A1949	1	SILK SCREEN
	301B2586	1	TRIM
	518P237	3	FASTENER - TRIM
	415-178	1	SCREW-HEX NO. 10-32 X 5/8 LG
	850-30	1	LOCKWASHER NO.
	99A866	1	NAMEPLATE - CONTROL
			8010719
	334A1890	25 FT	WIRE-FLEXIBLE NO. 20 AWG
	334A1842	1 FT	WIRE-FLEXIBLE NO. 10 AWG

7.5HA-23/12B

L	WAS N#10	7-9-69
K	WAS N#12	7-9-69
L	ADDED WIRE NO. 334A1842	7-9-69
K	" " " 334A1890	7-9-69
J	TB2 WAS 332-142	7-9-69
H	REV. WIRING TERMINAL 6	7-9-69
G	ADDED 315A291	7-9-69
F	REV. 309A5090 & 315A291	7-9-69
E	WAS 323P380 SOCKET	7-9-69
D	" " " 309A42	7-9-69
C	ADDED NOTES 2 & 3	7-9-69
B	ADDED LABEL 307A658	7-9-69
A	ADDED LEAD S1 TO K1	7-9-69
UN	REVISION	DATE
1	ORIGIN	12-29-66
2	BY	12-29-66
3	CHKD	12-29-66
4	APP'D	12-29-66
5	TESTED	12-29-66
6	INSPECTED	12-29-66
7	REWORKED	12-29-66
8	RETESTED	12-29-66
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100	RETESTED	12-29-66

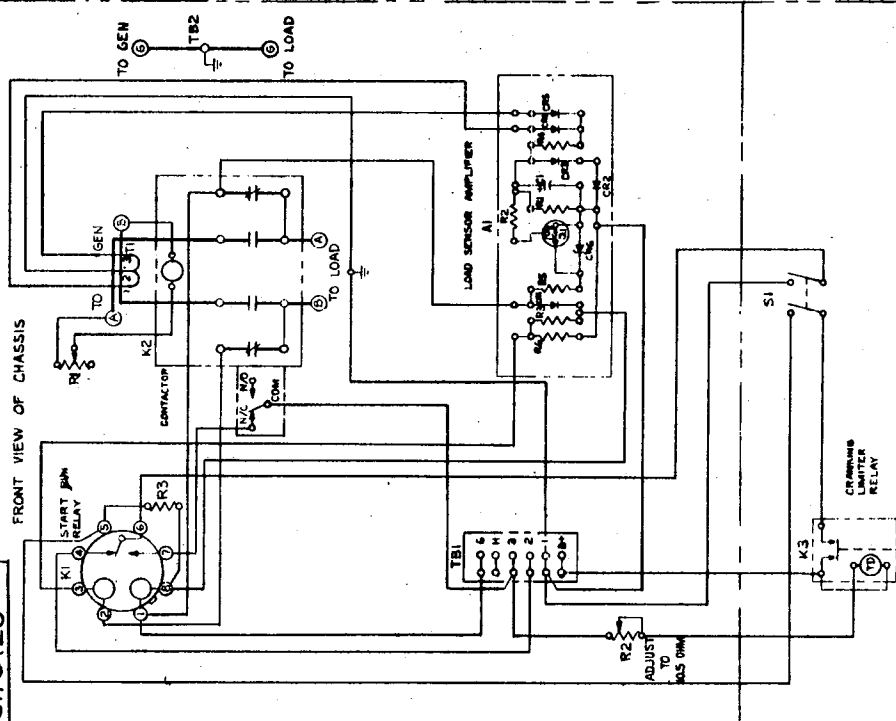
- CAUTION - IF GEN IS CONNECTED TO LOAD TERMINALS OF CONTACTOR (K2), THE AC OUTPUT VOLTAGE WILL DESTROY THE LOAD SENSOR AMPLIFIER.
- IT IS NOT NECESSARY TO CONNECT TERMINAL 1 TO GEN, BECAUSE GENERATOR AND CONTROL ARE CONNECTED THRU THE AC GROUND LEAD.

NOTE: 1 - OPERATE WITH NEGATIVE GROUND ONLY

617C128

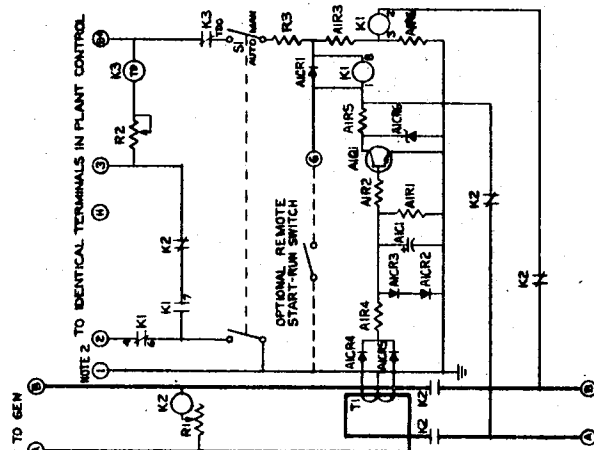
WIRING DIAGRAM

FRONT VIEW OF CHASSIS



REAR VIEW OF DOOR

SCHEMATIC



PARTS LIST

REF. DES.	PART NO.	QTY.	DESCRIPTION
A1	300B463	1	AMPLIFIER ASSY - LOAD SENSOR
K1	332A932	1	BOARD - INSULATING
K2	307A858	1	RELAY - START RUN
K3	323P321	1	SOCKET
K4	307C666	1	CONTACTOR
K5	98A2045	1	CAUTION LABEL
K6	160-144	2	STRAP
K7	332-517	4	TERMINAL
K8	309A42	1	SWITCH - AUX
K9	309A183	1	INSULATOR
K10	320B104	1	RELAY - CRANKING LIMITER
R1	304A131	1	RESISTOR, 750 OHM, 25 W
R2	304A222	1	RESISTOR, 15 OHM, 50 W
S1	308P88	1	SWITCH - AUTO MANUAL
T1	315A291	1	TRANS. ASSY - CURRENT
T2	332A699	1	ELECT. - TERMINAL
T3	98A1327	1	SILK SCREEN
T4	332-142	2	TERMINAL - GROUND
R3	350-984	1	RESISTOR, 750 OHM, 2 W
R4	301D2573	1	CONTROL BOX
R5	98C1815	1	SILK SCREEN
R6	98A1949	1	SILK SCREEN
R7	301B2586	1	TRIM
R8	518P237	3	FASTENER - TRIM
R9	815-178	1	SCREW - #12 X 1/2-32 X 5/8 LG
R10	850-30	1	LOCKWASHER - #10
R11	99A886	1	NAM. PLATE - CONTROL
R12	334A152	12	NO. 20 WIRE - WHITE
R13	332-901	14	TERMINAL - 1/2"
R14	332-802	2	TERMINAL - 1/2"
R15	332-803	3	TERMINAL - 1/2"
R16	850-11	1	22.50 PER WIRE #16 RESIN ONE

617C128

7.5HA-23-4/1B

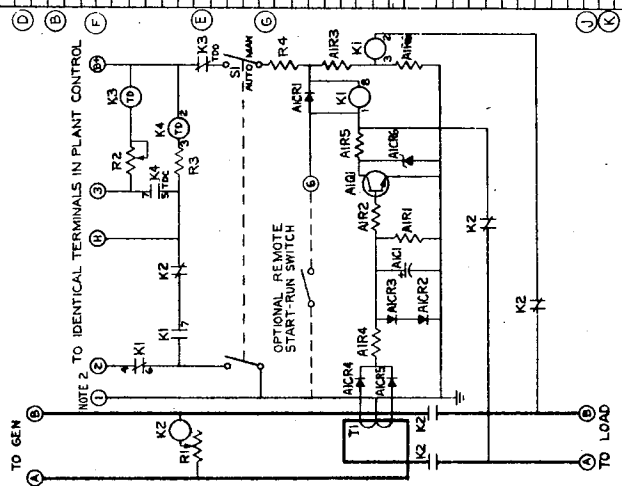
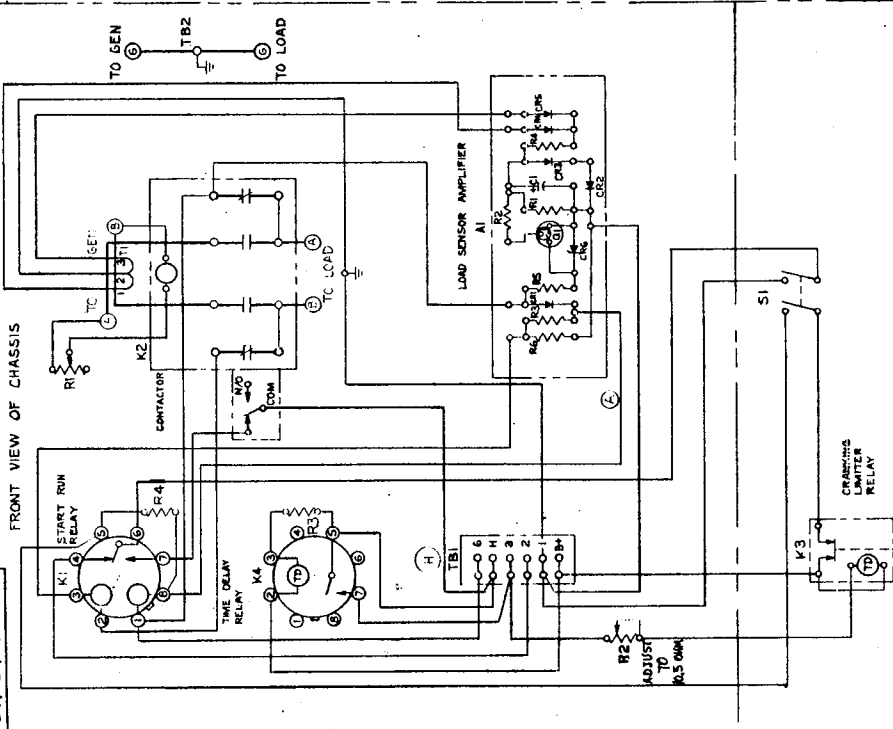
- CAUTION - IF GEN IS CONNECTED TO LOAD TERMINALS OF CONTACTOR (K2), THE AC OUTPUT VOLTAGE WILL DESTROY THE LOAD SENSOR AMPLIFIER.
- IT IS NOT NECESSARY TO CONNECT TERMINAL 1 TO GEN, BECAUSE GENERATOR AND CONTROL ARE CONNECTED THRU THE AC GROUND LEAD.

NOTE: 1 - OPERATE WITH NEGATIVE GROUND ONLY

DATE	REV.	BY	CHKD.
6-21-66	1	7.5	101
OGEAR			
DIVISION OF PROGRESS CORPORATION			
7.5HA-23-4/1B			
32 VOLT CRANKING			
AUTOMATIC DEMAND CONTROL			
120/240 V, 1PH, 3 WIRE, 50/60 CY			
617C128			

NOTE: UNLESS OTHERWISE NOTED, ALL COMPONENTS ARE SHOWN IN THE DE-ENERGIZED POSITION.

SCHEMATIC



REF DES	PART NO	QTY	PARTS LIST	DESCRIPTION
AL	3070463	1	AMPLIFIER ASSY - LOAD SENSOR	
	332A932	1	BORD - INSULATING	
XI	3071856	1	RELAY - START RUN	
	323P950	1	SOCKET	
K2	3076666	1	CONTRACTOR	
	98A2045	1	CUTION LABEL	
	160-144	2	STRAP	
	332-517	4	ERMINAL	
	305442	1	SWITCH - AUX	
	305A193	1	INSULATOR	
K3	320B104	1	RELAY - CRANKING LIMITER	
K4	3074679	1	RELAY - TIME DELAY PREHENT (20S)	
	323P580	1	SOCKET	
R1	304A131	1	RESISTOR, 750 OHM, 25W	
R2	304A222	1	RESISTOR, 15 OHM, 50W	
SI	308P98	1	SWITCH - AUTO MANUAL	
TI	315A25	1	TRANS. ASSY - CURRENT	
TBI	332A699	1	BLOCK - TERMINAL	
	96A1927	1	SILK SCREEN	
TB2	332-142	2	TERMINAL - GROUND	
R3	350-520	1	RESISTOR, 47 OHM, 1/2 W	
R4	350-984	1	RESISTOR, 750 OHM, 2 W	
	301D2573	1	CONTROL BOX	
	98C1815	1	SILK SCREEN	
	98A1949	1	SILK SCREEN	
	301B2566	1	TRM	
	518P237	3	FASTENER - TRIM	
	613-170	1	SCREW - HEX MD #10-32 x 5/8 LG	
	850-30	1	LOCKWASHER #10	
	99A966	1	NAMEPLATE - CONTROL	
	334A1890	35FT	WIRE-FLEXIBLE NO. 20 AWG	197C111
	334A1842	12FT	WIRE-FLEXIBLE NO. 16 AWG	

7.5HA-23-4/10B

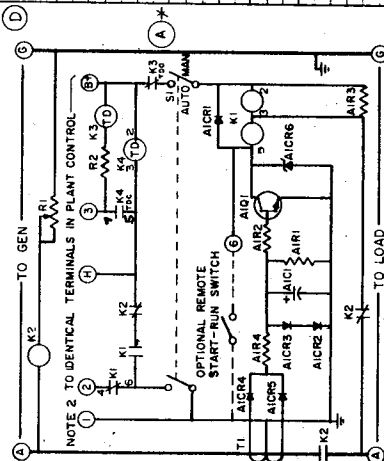
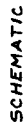
K	ADDED WIRE NO 3347, 542	3-22-61
J	3344, 365	3-22-61
I	PREV. WIRING TERMINAL 6	3-22-61
G	ADDED 3343A91	3-22-61
F	REM. 3343A, 2347A, 3343A	3-22-61
E	WAS 323 P-58 SOCKET	3-22-61
D	"	3-22-61
C	CHANGED NOTES 2, 2, 3	3-22-61
B	ADDED LABEL 3342-245	3-22-61
A	WAS 3342-245	3-22-61
LET	REVISION	DATE
DIVISION OF THUNDERBOLT CORPORATION		

75HA-23-4/10B	2-1-67	CDR	W. J. R.
32 VOLT CRANKING	SCHEMATIC & WIRING DIAGRAM		
120/240 V, 1 PH,	AUTOMATIC DEMAND CONTROL		
3 WIRE, 50/60 CY.	PAGE NO		
617C111			

3. CAUTION - IF GEN IS CONNECTED TO LOAD TERMINALS OF CONTACTOR (K2), THE AC OUTPUT VOLTAGE WILL DESTROY THE LOAD SENSOR AMPLIFIER.
2. IT IS NOT NECESSARY TO CONNECT TERMINAL 1 TO GEN. BECAUSE GENERATOR AND CONTROL ARE CONNECTED THRU THE AC GROUND LEAD.

NOTE: 1 - OPERATE WITH NEGATIVE GROUND ONLY

FRONT VIEW OF CHASSIS




SCHEMATIC

REF DES	PART NO	QTY	PARTS LIST	DESCRIPTION
A1	300B443	1		AMPLIFIER ASSY-LOAD SENSOR
K1	332A932	1		BOARD-INSULATING
K1	307A62	1		RELAY-START RUN
K2	323P380	1		SOCKET
K2	307C666	1		CONTACTOR
K3	332-142	2		TERMINAL
K3	307A685	2		JUMPER
K4	307A104	1		RELAY-CRANKING LIMITER
R1	307A645	1		RELAY-TIME DELAY-PREHEAT
R1	323P380	1		SOCKET
R2	304A131	1		RESISTOR-750-OHM, 25W
S1	304A152	1		RESISTOR, 3-OHM, 10W
T1	308P88	1		SWITCH-AUTO MANUAL
T1	315A241	1		TRANS ASSY-CURRENT
T2	332A699	1		BLOCK-TERMINAL
T2	96A1927	1		SILK SCREEN
T2	332-142	2		TERMINAL-GROUND
	96A2045	1		CALCULON LABEL
	301D2573	1		CONTROL BOX
	98C1B15	1		SILK SCREEN
	98A1528	1		SILK SCREEN
	301B2566	1		TRIM
	518P237	3		FASTENER-TRIM
	815-178	1		SCREW-HEX HD #0-32X3/8LG
	850-30	1		LOCKWASHER #10
	99A966	1		NAMEPLATE-CONTROL
				89C719

617698

15:0HA-22/10B

D	I	A.S.	323P2	SECRET	JT	11-9-67
C	"	"	"	"	JT	11-9-67
B	"	"	"	"	JT	10-31-67
BLANDED NOTES	2	2	3			
A ADDIC LABEL	26A204S	5V	31-67			
SUPPLDS LMG	AVE N	DATED	823-64			
REVISION	CRS	DATE				
117						



DIVISION OF FORECASTING CORPORATION
COMMUNICATIONS SECTION

2 - 2A - 67
 DR
 JIN Var WJB
 177

SCHEMATIC & WIRING DIAGRAM

AUTOMATIC DEMAND CONTROL

ENG NO

617C98

DIVISION OF STUDENT CORRELATION

012	14	14
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2-24-67	DR	JIM VINT	WJB
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SCHEMATIC & WIRING DIAGRAM

AUTOMATIC DEMAND CONTROL

617098

06/19

• ACTION

1 - OPERATE WITH NEGATIVE GROUND ONLY

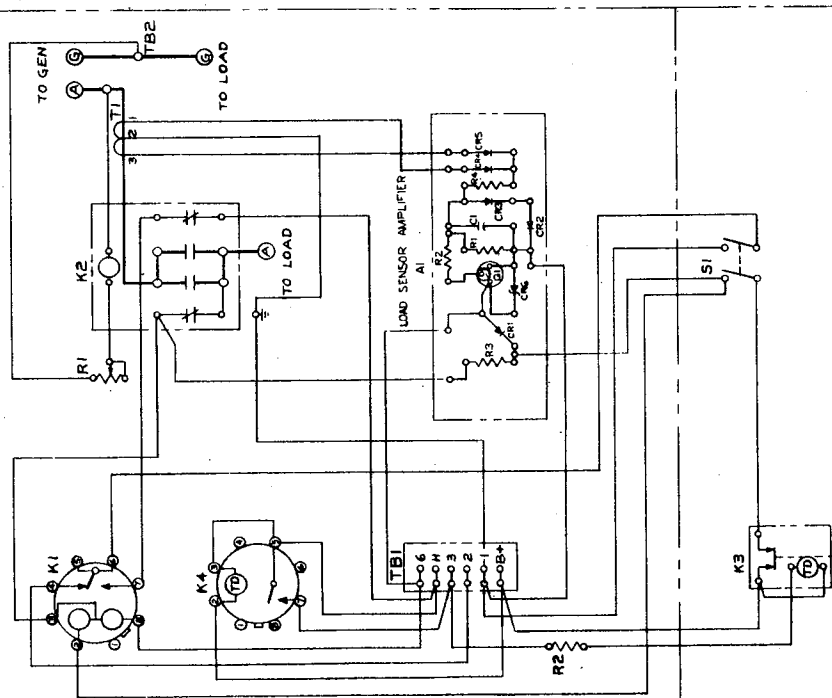
2. IT IS NOT NECESSARY TO CONNECT TERMINAL 1 TO GEN. BECAUSE GENERATOR AND CONTROL ARE CONNECTED THRU THE AC GROUND LEAD.

3. CAUTION - IF GEN IS CONNECTED TO LOAD TERMINALS OF CONTACTOR (K2), THE AC OUTPUT VOLTAGE WILL DESTROY THE LOAD SENSOR AMPLIFIER.

617C99

WIRING DIAGRAM

FRONT VIEW OF CHASSIS



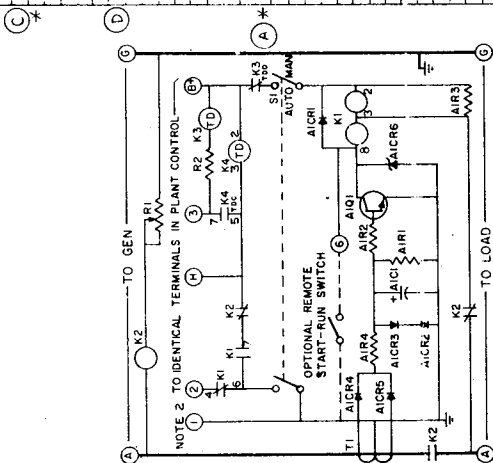
NOTE:

1- OPERATE WITH NEGATIVE GROUND ONLY

2. IT IS NOT NECESSARY TO CONNECT TERMINAL 1 TO GEN. BECAUSE GENERATOR AND CONTROL ARE CONNECTED THRU THE AC GROUND LEAD.

3. CAUTION - IF GEN. IS CONNECTED TO LOAD TERMINALS OF CONTACTOR (K2), THE AC OUTPUT VOLTAGE WILL DESTROY THE LOAD SENSOR AMPLIFIER.

SCHEMATIC



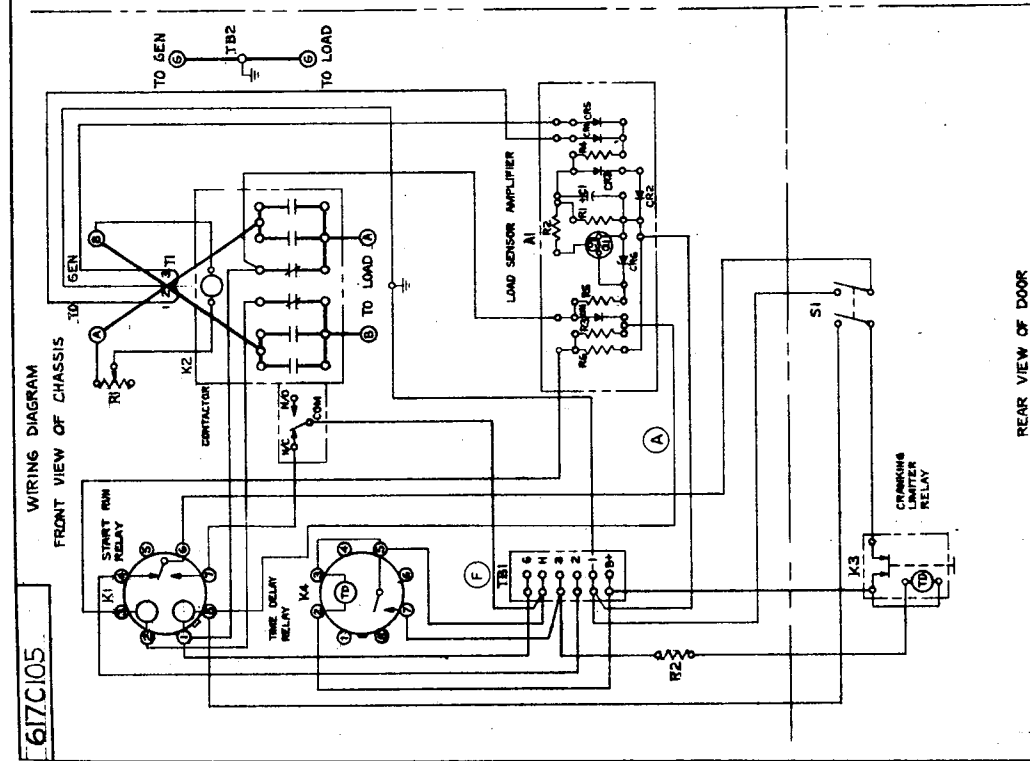
662L19

15.0HA-22/12B

REF DES	PART NO.	QTY	DESCRIPTION
A1	300B443	1	AMPLIFIER ASSY-LOAD SENSOR
K1	302A932	1	BOARD-INSULATING
K2	302A932	1	RELAY START RUN
K3	302P292	1	CONTACTOR
K4	302C666	2	TERMINAL
K5	302A932	2	TERMINAL
K6	302A932	2	TERMINAL
K7	302A932	2	TERMINAL
K8	302A932	2	TERMINAL
K9	302A932	2	TERMINAL
K10	302A932	2	TERMINAL
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K13	302A932	2	TERMINAL
K14	302A932	2	TERMINAL
K15	302A932	2	TERMINAL
K16	302A932	2	TERMINAL
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K19	302A932	2	TERMINAL
K20	302A932	2	TERMINAL
K21	302A932	2	TERMINAL
K22	302A932	2	TERMINAL
K23	302A932	2	TERMINAL
K24	302A932	2	TERMINAL
K25	302A932	2	TERMINAL
K26	302A932	2	TERMINAL
K27	302A932	2	TERMINAL
K28	302A932	2	TERMINAL
K29	302A932	2	TERMINAL
K30	302A932	2	TERMINAL
K31	302A932	2	TERMINAL
K32	302A932	2	TERMINAL
K33	302A932	2	TERMINAL
K34	302A932	2	TERMINAL
K35	302A932	2	TERMINAL
K36	302A932	2	TERMINAL
K37	302A932	2	TERMINAL
K38	302A932	2	TERMINAL
K39	302A932	2	TERMINAL
K40	302A932	2	TERMINAL
K41	302A932	2	TERMINAL
K42	302A932	2	TERMINAL
K43	302A932	2	TERMINAL
K44	302A932	2	TERMINAL
K45	302A932	2	TERMINAL
K46	302A932	2	TERMINAL
K47	302A932	2	TERMINAL
K48	302A932	2	TERMINAL
K49	302A932	2	TERMINAL
K50	302A932	2	TERMINAL
K51	302A932	2	TERMINAL
K52	302A932	2	TERMINAL
K53	302A932	2	TERMINAL
K54	302A932	2	TERMINAL
K55	302A932	2	TERMINAL
K56	302A932	2	TERMINAL
K57	302A932	2	TERMINAL
K58	302A932	2	TERMINAL
K59	302A932	2	TERMINAL
K60	302A932	2	TERMINAL
K61	302A932	2	TERMINAL
K62	302A932	2	TERMINAL
K63	302A932	2	TERMINAL
K64	302A932	2	TERMINAL
K65	302A932	2	TERMINAL
K66	302A932	2	TERMINAL
K67	302A932	2	TERMINAL
K68	302A932	2	TERMINAL
K69	302A932	2	TERMINAL
K70	302A932	2	TERMINAL
K71	302A932	2	TERMINAL
K72	302A932	2	TERMINAL
K73	302A932	2	TERMINAL
K74	302A932	2	TERMINAL
K75	302A932	2	TERMINAL
K76	302A932	2	TERMINAL
K77	302A932	2	TERMINAL
K78	302A932	2	TERMINAL
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K80	302A932	2	TERMINAL
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K84	302A932	2	TERMINAL
K85	302A932	2	TERMINAL
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K88	302A932	2	TERMINAL
K89	302A932	2	TERMINAL
K90	302A932	2	TERMINAL
K91	302A932	2	TERMINAL
K92	302A932	2	TERMINAL
K93	302A932	2	TERMINAL
K94	302A932	2	TERMINAL
K95	302A932	2	TERMINAL
K96	302A932	2	TERMINAL
K97	302A932	2	TERMINAL
K98	302A932	2	TERMINAL
K99	302A932	2	TERMINAL
K100	302A932	2	TERMINAL

15.0HA-22/12B
12 VOLT CRANKING
240V, 1PH, 3W, 50/60CY

617C99



REFDES	PART NO.	QTY	PARTS LIST	DESCRIPTION
A1	300B463	1	AMPLIFIER ASSY - LOAD SENSOR	
K1	322A532	1	RELAY - START RUN	
K2	323P380	1	CONTACTOR	
K3	307A685	4	JUMPER	
K4	307A685	4	JUMPER	
K5	307A685	4	JUMPER	
K6	307A685	4	JUMPER	
K7	307A685	4	JUMPER	
K8	307A685	4	JUMPER	
K9	307A685	4	JUMPER	
K10	307A685	4	JUMPER	
K11	307A685	4	JUMPER	
K12	307A685	4	JUMPER	
K13	307A685	4	JUMPER	
K14	307A685	4	JUMPER	
K15	307A685	4	JUMPER	
K16	307A685	4	JUMPER	
K17	307A685	4	JUMPER	
K18	307A685	4	JUMPER	
K19	307A685	4	JUMPER	
K20	307A685	4	JUMPER	
K21	307A685	4	JUMPER	
K22	307A685	4	JUMPER	
K23	307A685	4	JUMPER	
K24	307A685	4	JUMPER	
K25	307A685	4	JUMPER	
K26	307A685	4	JUMPER	
K27	307A685	4	JUMPER	
K28	307A685	4	JUMPER	
K29	307A685	4	JUMPER	
K30	307A685	4	JUMPER	
K31	307A685	4	JUMPER	
K32	307A685	4	JUMPER	
K33	307A685	4	JUMPER	
K34	307A685	4	JUMPER	
K35	307A685	4	JUMPER	
K36	307A685	4	JUMPER	
K37	307A685	4	JUMPER	
K38	307A685	4	JUMPER	
K39	307A685	4	JUMPER	
K40	307A685	4	JUMPER	
K41	307A685	4	JUMPER	
K42	307A685	4	JUMPER	
K43	307A685	4	JUMPER	
K44	307A685	4	JUMPER	
K45	307A685	4	JUMPER	
K46	307A685	4	JUMPER	
K47	307A685	4	JUMPER	
K48	307A685	4	JUMPER	
K49	307A685	4	JUMPER	
K50	307A685	4	JUMPER	
K51	307A685	4	JUMPER	
K52	307A685	4	JUMPER	
K53	307A685	4	JUMPER	
K54	307A685	4	JUMPER	
K55	307A685	4	JUMPER	
K56	307A685	4	JUMPER	
K57	307A685	4	JUMPER	
K58	307A685	4	JUMPER	
K59	307A685	4	JUMPER	
K60	307A685	4	JUMPER	
K61	307A685	4	JUMPER	
K62	307A685	4	JUMPER	
K63	307A685	4	JUMPER	
K64	307A685	4	JUMPER	
K65	307A685	4	JUMPER	
K66	307A685	4	JUMPER	
K67	307A685	4	JUMPER	
K68	307A685	4	JUMPER	
K69	307A685	4	JUMPER	
K70	307A685	4	JUMPER	
K71	307A685	4	JUMPER	
K72	307A685	4	JUMPER	
K73	307A685	4	JUMPER	
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K80	307A685	4	JUMPER	
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K82	307A685	4	JUMPER	
K83	307A685	4	JUMPER	
K84	307A685	4	JUMPER	
K85	307A685	4	JUMPER	
K86	307A685	4	JUMPER	
K87	307A685	4	JUMPER	
K88	307A685	4	JUMPER	
K89	307A685	4	JUMPER	
K90	307A685	4	JUMPER	
K91	307A685	4	JUMPER	
K92	307A685	4	JUMPER	
K93	307A685	4	JUMPER	
K94	307A685	4	JUMPER	
K95	307A685	4	JUMPER	
K96	307A685	4	JUMPER	
K97	307A685	4	JUMPER	
K98	307A685	4	JUMPER	
K99	307A685	4	JUMPER	
K100	307A685	4	JUMPER	

15.0HA-23/10B

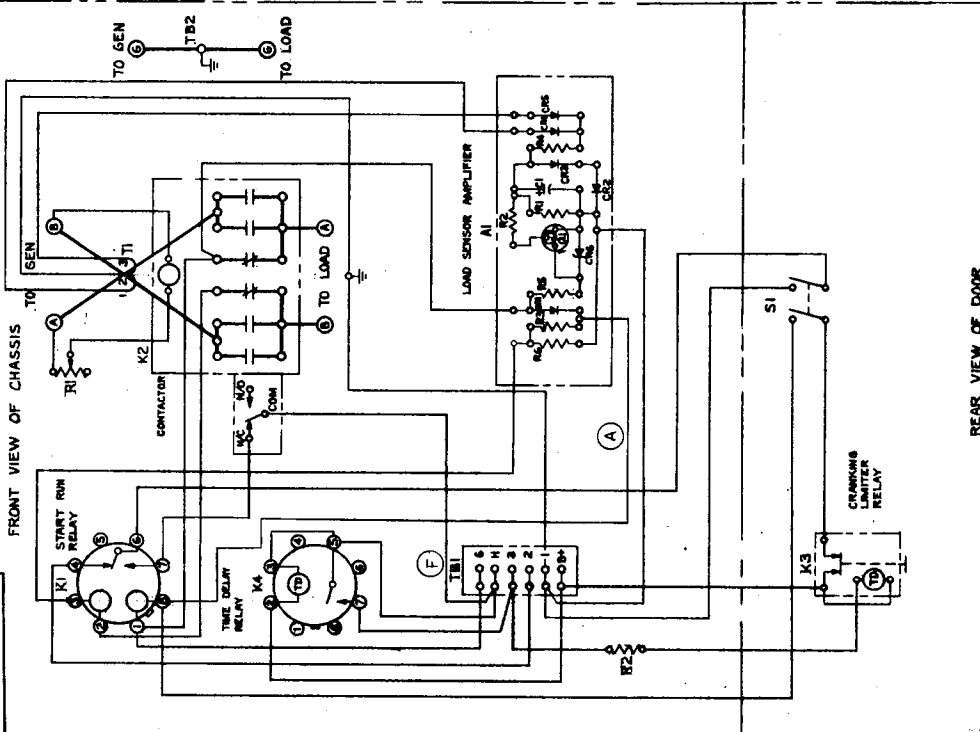
H	ADDED WIRE NO. 334A1890	1	WIRE - FLEXIBLE NO. 20 AWG	
G	ADDED WIRE NO. 334A1890	1	WIRE - FLEXIBLE NO. 20 AWG	
F	REV WIRING TERMINAL 6	1	WIRE - FLEXIBLE NO. 20 AWG	
E	AS 323P52 SOCKET	1	WIRE - FLEXIBLE NO. 20 AWG	
D	CADED NOTES 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100			
C	ADDED LABEL 98A1927	1	WIRE - FLEXIBLE NO. 20 AWG	
B	ADDED LEAD SI TO K1	1	WIRE - FLEXIBLE NO. 20 AWG	
A	ADDED LEAD SI TO K1	1	WIRE - FLEXIBLE NO. 20 AWG	
UN				

- CAUTION - IF GEN IS CONNECTED TO LOAD TERMINALS OF CONTACTOR (K2), THE AC OUTPUT VOLTAGE WILL DESTROY THE LOAD SENSOR AMPLIFIER.
 - IT IS NOT NECESSARY TO CONNECT TERMINAL 1 TO GEN, BECAUSE GENERATOR AND CONTROL ARE CONNECTED THRU THE AC GROUND LEAD.
- NOTE: 1 - OPERATE WITH NEGATIVE GROUND ONLY

617C104

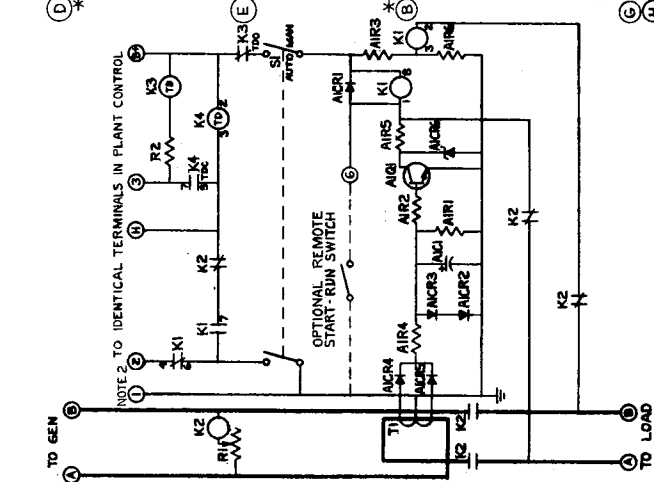
WIRING DIAGRAM

FRONT VIEW OF CHASSIS



REAR VIEW OF DOOR

SCHEMATIC



PARTS LIST

REFDES	PART NO.	QTY	DESCRIPTION
A1	300B463	1	AMPLIFIER ASSY - LOAD SENSOR
	332A332	1	BOARD - INSULATING
K1	307A858	1	RELAY - START RUN
K2	323P380	1	SOCKET
	307C667	1	CONTACTOR
	307A685	4	JUMPER
	160-144	2	STRAP
	307A942	2	BUS BAR
	332-142	4	TERMINAL 1 3/4" OF (838-22)
	309A42	1	SWITCH - AUX
	309A193	1	INSULATOR
K3	320B104	1	RELAY - CRANKING LIMITER
K4	307A685	1	RELAY - TIME DELAY, PRESENT (5)
	323P380	1	SOCKET
R1	304A131	1	RESISTOR, 750 OHM, 25W
R2	304A192	1	RESISTOR, 3 OHM, 10W
S1	308P88	1	SWITCH - AUTO MANUAL
T1	318A233	1	TRANS. ASSY - CURRENT
TB1	332A639	1	BLOCK - TERMINAL
TB2	98A1927	1	SILK SCREEN
	332-142	2	TERMINAL - GROUND
	98A2045	1	CAUTION LABEL
	301D5273	1	CONTROL BOX
	98C1815	1	SILK SCREEN
	98A1345	1	SILK SCREEN
	301B2586	1	TRIM
	518P237	3	FASTENER - TRIM
	815-178	1	SCREW - HEX NO 40-32 X 5/8 LG
	850-30	1	LOCKWASHER #40
	99A966	1	NAMEPLATE - CONTROL
	334A1850	25 FT	WIRE - FLEXIBLE NO. 20 AWG
	334A1842	12 FT	WIRE - FLEXIBLE NO. 16 AWG

15.0HA-23/12B

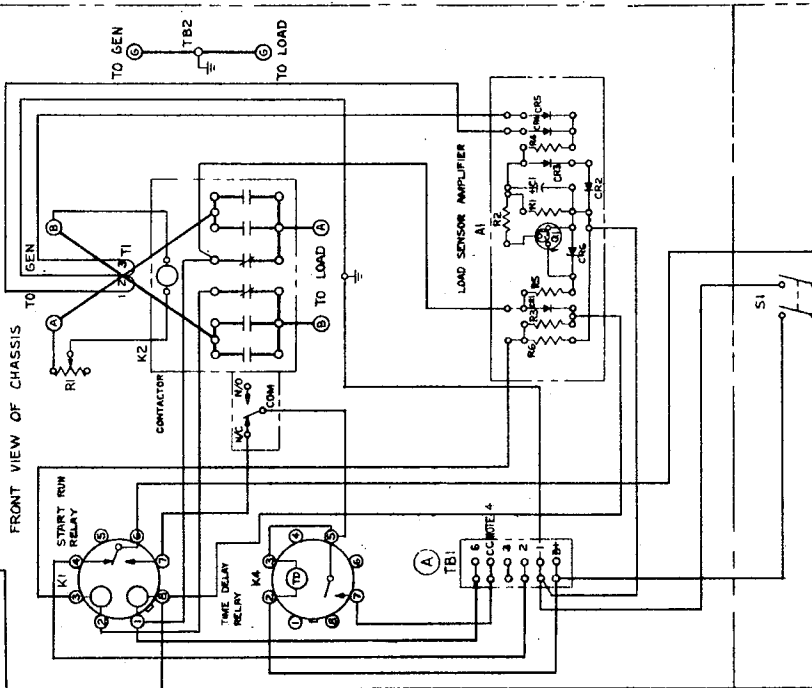
- CAUTION - IF GEN IS CONNECTED TO LOAD TERMINALS OF CONTACTOR (K2), THE AC OUTPUT VOLTAGE WILL DESTROY THE LOAD SENSOR AMPLIFIER.
 - IT IS NOT NECESSARY TO CONNECT TERMINAL 1 TO GEN, BECAUSE GENERATOR AND CONTROL ARE CONNECTED THRU THE AC GROUND LEAD.
- NOTE: 1 - OPERATE WITH NEGATIVE GROUND ONLY

H	ADDED WIRE NO 334A1842	25 FT	3-14-69
G	ADDED WIRE NO 334A1850	25 FT	3-14-69
F	REV. WIRING TERMINAL 6	27	1-24-68
E	WAS 323P380 SOCKET	27	11-9-67
D	"	27	11-9-67
C	ADDED NOTES 2 & 3	27	11-11-67
B	ADDED LABEL 98A2045	27	11-11-67
A	MOVED LEAD S1 TO K1	27	7-25-67
REV	REVISION	DATE	
BY	DESIGNED BY	DATE	
CHKD	CHECKED BY	DATE	
APP'D	APPROVED BY	DATE	
15.0 HA - 23/12B	CDR	15.0 HA - 23/12B	
12 VOLT CRANKING		SCHEMATIC & WIRING DIAGRAM	
120/240 V, 1 PH,		AUTOMATIC DEMAND CONTROL	
3 WIRE, 50/60 CY			
		617C104	

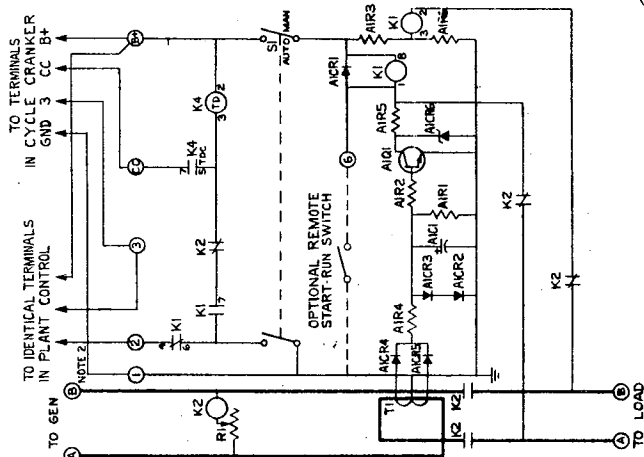
617C116

WIRING DIAGRAM

FRONT VIEW OF CHASSIS



SCHEMATIC



PARTS LIST

REFDES	PART NO	QTY	DESCRIPTION
A1	302B463	1	AMPLIFIER ASSY - LOAD SENSOR
K1	302A932	1	BOARD - INSULATING
K1	302A858	1	RELAY - START RUN
K2	302P380	1	SOCKET
K2	302C667	1	CONTACTOR
K2	302A865	4	JUMPER
K2	160-144	2	STRAP
K2	302A942	2	BUS BAR
K2	302A942	2	SLIDING 1 3/4" OF (858-22)
K2	302A942	2	TERMINAL
K2	302A942	2	SWITCH - AUT
K2	302A942	2	INSULATOR
K4	302A859	1	RELAY - TIME DELAY, PREHEAT (E)
R1	302A930	1	SOCKET
R1	302A931	1	RESISTOR, 750 OHM, 25W
S1	302P808	1	SWITCH - AUTO MANUAL
TB1	302A859	1	TERMINAL ASSEMBLY - CURRENT
TB1	302A859	1	LOCK - TERMINAL
TB2	302A859	1	SILK SCREEN
TB2	302A859	2	TERMINAL - GROUND
	98A2045	1	CAUTION LABEL
	302D573	1	CONTROL BOX
	98C1815	1	SILK SCREEN (NOTE 5)
	302B3586	1	TRIM
	516P237	3	PASTENER - TRIM
	815-178	1	SCREW - HEX WD #10-32 X 5/8 LG
	850-30	1	LOCKWASHER - WIG
	99A966	1	NAMEPLATE - CONTROL
	517-12	1	DOT BUTTON
	517-43	2	DOT BUTTON
	324A890	2	WIRE - FLEXIBLE
	324A892	2	WIRE - FLEXIBLE

REAR VIEW OF DOOR

USE WITH TYPE III CYCLE CRANKER WD. 625B224

ON SILKSCREEN 98C1815, PAINT GREEN OVER "CRANKING LIMITER" & "RESET AFTER 1 MINUTE"

PASTE PRINT OF SCHEMATIC INSIDE COVER OF CONTROL BOX

EESIDE TB1, STAMP CC IN PLACE OF H

CAUTION - IF GEN IS CONNECTED TO LOAD TERMINALS OF CONTACTOR (K2), THE AC OUTPUT VOLTAGE WILL DESTROY THE LOAD SENSOR AMPLIFIER.

IT IS NOT NECESSARY TO CONNECT TERMINAL 1 TO GEN, BECAUSE GENERATOR AND CONTROL ARE CONNECTED THRU THE AC GROUND LEAD.

NOTE: 1 - OPERATE WITH NEGATIVE GROUND ONLY

15.0HA-23/15B

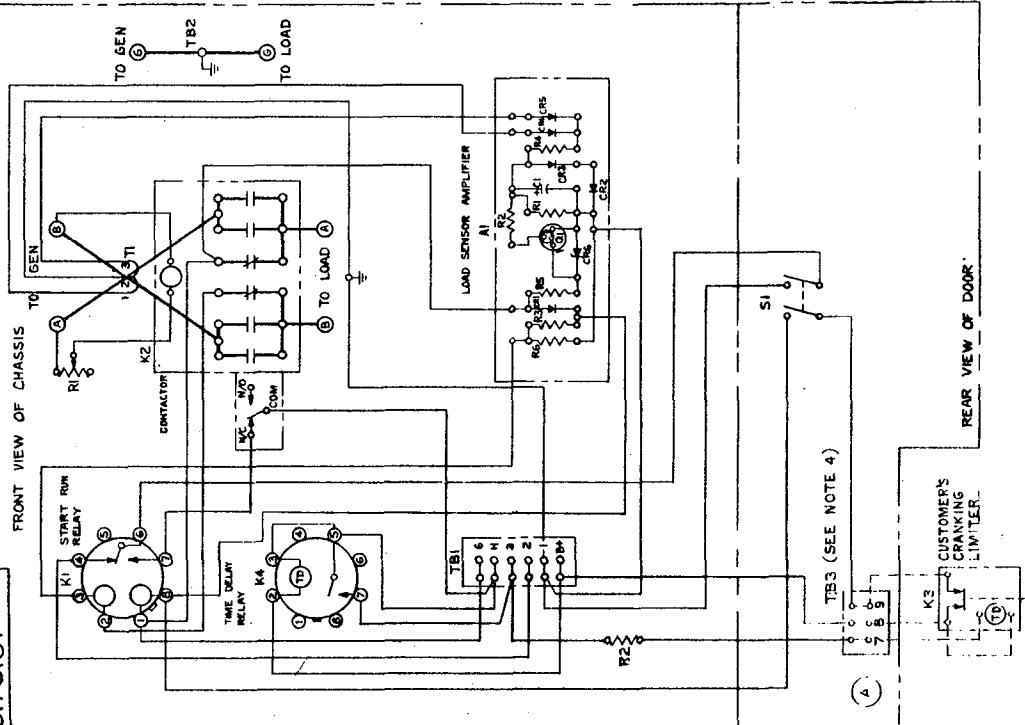
NOTE: UNLESS OTHERWISE NOTED, ALL COMPONENTS ARE SHOWN IN THE DE-ENERGIZED POSITION.

REV	DATE	BY	CHK	APP	DESCRIPTION
1	11-17-67	W			15.0HA-23/15B
2	11-17-67	W			SCHEMATIC & WIRING DIAGRAM
3	11-17-67	W			AUTOMATIC DEMAND CONTROL
4	11-17-67	W			3 WIRE, 50/60 CY
5	11-17-67	W			617C116

617C131

WIRING DIAGRAM

FRONT VIEW OF CHASSIS



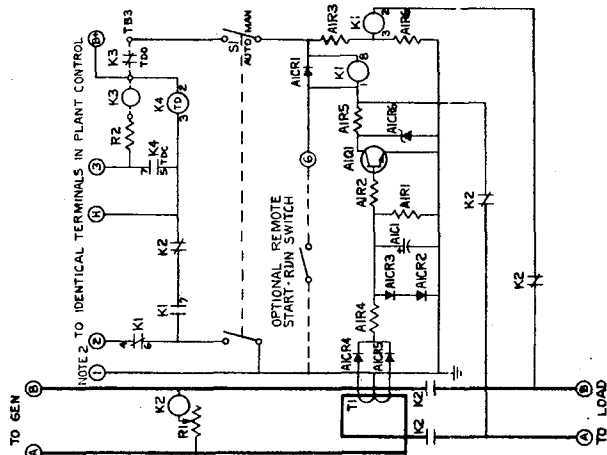
REAR VIEW OF DOOR

CUSTOMER'S
CRANKING
LIMITER

4. PAINT BACK OF MARKER STRIP WHITE, BEFORE MTG IT IN BOX
3. CAUTION - IF GEN IS CONNECTED TO LOAD TERMINALS OF CONTACTOR (K2). THE AC OUTPUT VOLTAGE WILL DESTROY THE LOAD SENSOR AMPLIFIER.
2. IT IS NOT NECESSARY TO CONNECT TERMINAL 1 TO GEN, BECAUSE GENERATOR AND CONTROL ARE CONNECTED THRU THE AC GROUND LEAD.

NOTE: 1 - OPERATE WITH NEGATIVE GROUND ONLY

SCHEMATIC



NOTE 2 - TO IDENTICAL TERMINALS IN PLANT CONTROL

OPTIONAL REMOTE START RUN SWITCH

PARTS LIST

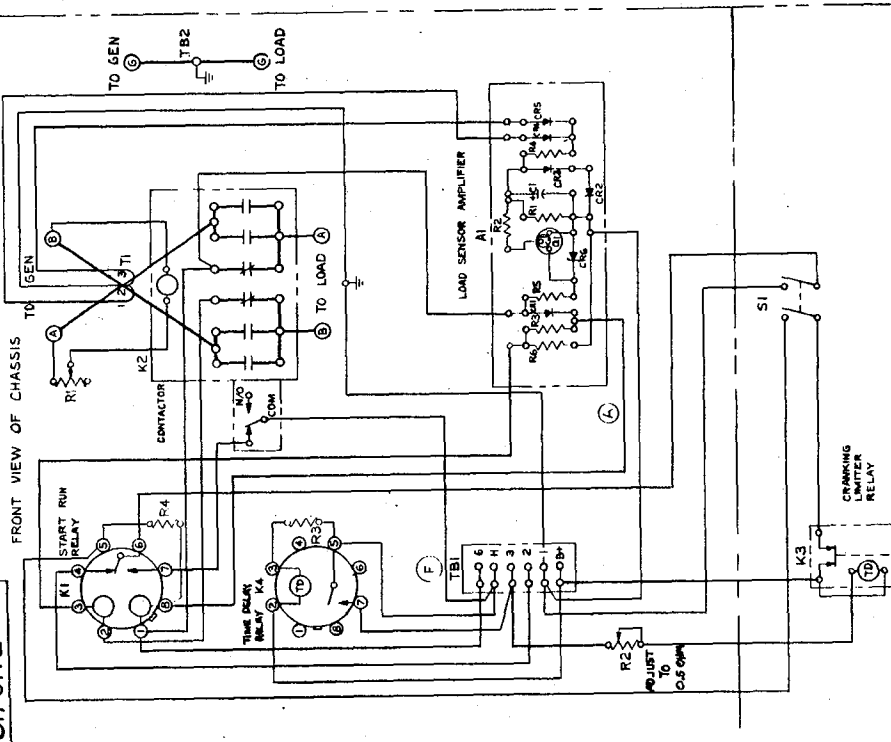
REF DES	PART NO.	QTY	DESCRIPTION
A1	300B463	1	AMPLIFIER ASSY - LOAD SENSOR
K1	332A932	1	BOARD - INSULATING
K2	307A958	1	RELAY - START RUN
K3	323P380	1	CONTACTOR
K4	307C667	4	JUMPER
	160-144	2	STRAP
	307A942	2	BUS BAR
	307A942	2	SLEEVING 1/4" OF (818-22)
	332-142	4	TERMINAL
	309A42	1	SWITCH - AUX
	309A193	1	INSULATOR
K3	320B104REF	1	RELAY - CRANKING LIMITER
K4	307A685	1	RELAY - TIME DELAY, PREHEAT (5 S)
	323P380	1	CONTACTOR
R1	304A131	1	RESISTOR, 750 OHM, 25W
R2	304A192	1	RESISTOR, 3 OHM, 10W
S1	308P88	1	SWITCH - AUTO MANUAL
T1	319A233	1	TRANS. ASSY - CURRENT
T81	332A699	1	BLOCK - TERMINAL
T82	98A1927	2	SILK SCREEN
T83	332-142	2	TERMINAL - GROUND
	332A611	1	BLOCK - TERMINAL
	332A612	1	STRIP - MARKER (SEE NOTE 4)
	98A2C45	1	CAUTION LABEL
	301D2573	1	CONTROL BOX, MODIFY
	98C1815	1	SILK SCREEN
	98A1849	1	SILK SCREEN
	301B2586	1	TRIM
	516P237	3	FASTENER - TRIM
	815-178	1	SCREW - HEX NO #10-32 X 5/8 LG
	850-30	1	LOCKWASHER #10
	99A966	1	NAMEPLATE - CONTROL
	1C17C131		
	334A189025H		WIRE-FLEXIBLE NO 20 AWG
	334A1842		WIRE-FLEXIBLE NO 16 AWG

15.0HA-23/18B

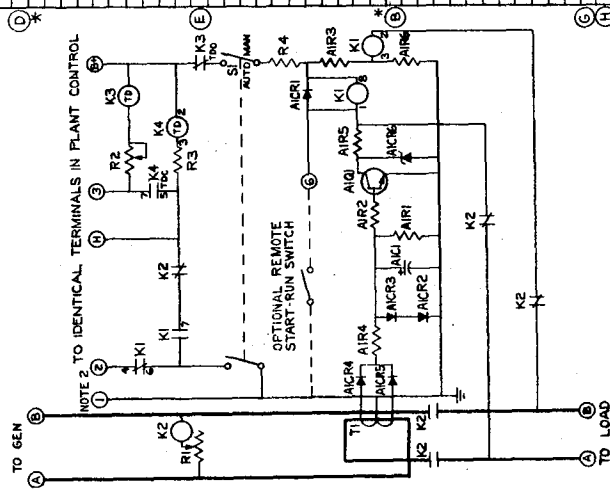
15.0HA-23/18B
12 VOLT CRANKING
120/240 V, 1PH,
3 WIRE, 50/60 CY

617C131
WIRING DIAGRAM
CONTROL-AUTOMATIC DELAYED
3 WIRE, 50/60 CY

617C112



SCHEMATIC



REF ID	PART NO.	QTY	PARTS LIST	DESCRIPTION
AL	30C6453	1	AMPLIFIER ASSY - LOAD SENSOR	
	30C6452	1	BOARD - INSULATING	
KI	30A1956	1	RELAY - START RUM	
	323P360	1	SOCKET	
K2	30C6667	1	CONTRACTOR	
	30TA685	4	JUNIOR	
	160-144	2	STRAP	
	30TA942	2	BUS BAR	
	332-142	4	TERMINAL	
	309A442	1	SWITCH - AUX	
	309A193	1	INSULATOR	
K3	320B104	1	RELAY - CRANKING LIMITER	
K4	30TA879	1	RELAY - TIME DELAY, PREHEAT (20S)	
	323P360	1	SOCKET	
RI	30A4131	1	RESISTOR, 750 OHM, 25W	
R2	304A222	1	RESISTOR, 15 OHM, 53W	
SI	30B988	1	SWITCH - AUTO MANUAL	
TI	315A233	1	TRANS. ASSY - CURRENT	
T8I	332A659	1	BLOCK - TERMINAL	
	98A1927	1	SILK SCREEN	
T82	332-142	2	TERMINAL - GROUND	
R3	350-520	1	RESISTOR, 47 OHM, 1/2 W	
R4	350-984	1	RESISTOR, 75C OHM, 2 W	
	98A2045	1	CAUTION LABEL	
	30ID2573	1	CONTROL BOX	
	98C1815	1	SILK SCREEN	
	98A1949	1	SILK SCREEN	
	301B2566	1	TRIM	
	518P237	3	FASTENER - TRIM	
	815-178	1	SCREW - HEX HD #10-32 X 5/8 LG	
	850-30	1	LOCKWASHER #10	
	99A966	1	NAMEPLATE - CONTROL	
			CONTROL	
			217C112	
	33AA1890	25FT	WIRE-FLEXIBLE	NO.20 AWG
	33AA1842	25FT	WIRE-FLEXIBLE	NO.14 AWG

15.0HA-23-4/10B

[illegible]

15.0A - 23-4/10B	32 VOLT CRANKING	120/240 V., 1 PH., 3 WIRE, 50/60 CY.
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13. CAUTION - IF GEN IS CONNECTED TO LOAD TERMINALS OF CONTACTOR (K2), THE AC OUTPUT VOLTAGE WILL DESTROY THE LOAD SENSOR AMPLIFIER.
2. IT IS NOT NECESSARY TO CONNECT TERMINAL 1 TO GEN, BECAUSE GENERATOR AND CONTROL ARE CONNECTED THRU THE AC GROUND LEAD.

NOTE: - OPERATE WITH NEGATIVE GROUND ONLY

**INDEX
FOR
SPEC C CONTROLS**

Find the appropriate model and proceed to the indicated page for the wiring diagram.

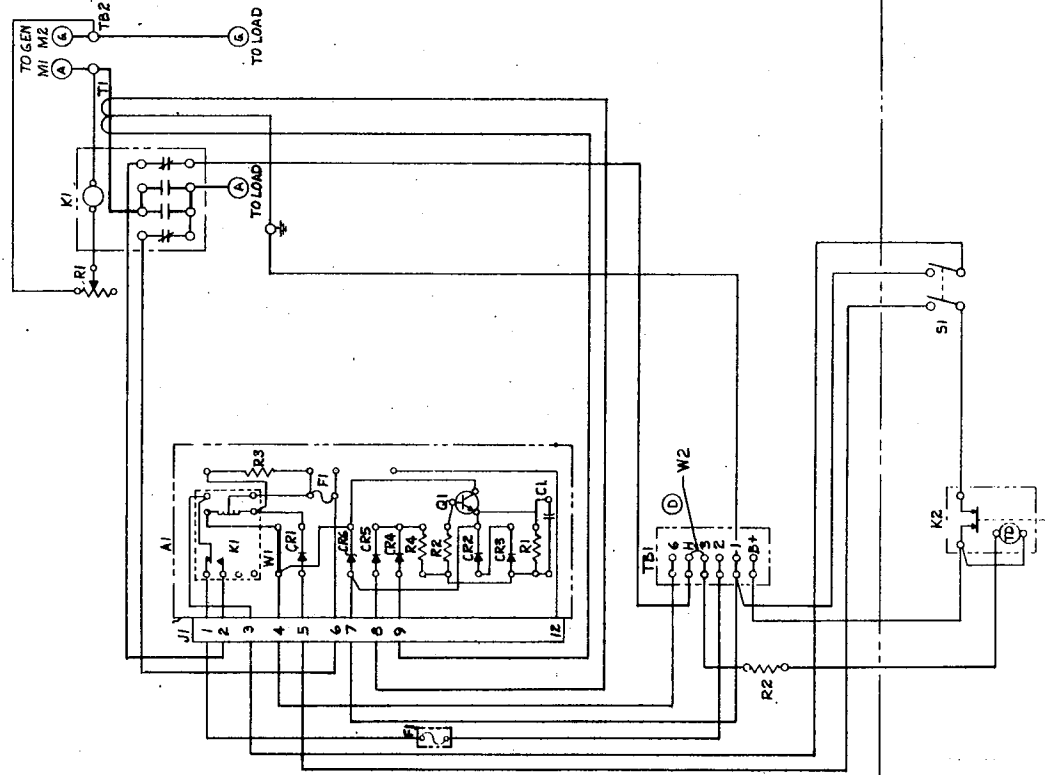
WATT RATING	MODEL	WIRING DIAGRAM	PAGE
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	7.5HA-21/12	617C133	62
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	7.5HA-23/10	617C141	66
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PRINTED CIRCUIT BOARDS

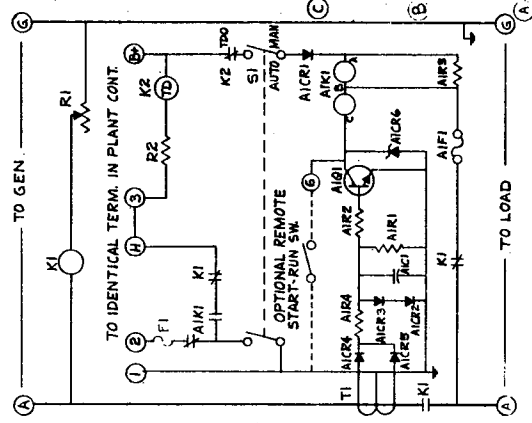
Individual components of the printed circuit boards are given on pages 73 and 74.

617C132

WIRING DIAGRAM
FRONT VIEW OF CHASSIS



SCHEMATIC



- NOTES:
1. OPERATE WITH NEGATIVE GROUND ONLY.
 2. IT IS NOT NECESSARY TO CONNECT TERMINAL 1 TO GEN BECAUSE GEN & CONTROL ARE CONNECTED THRU THE AC GROUND LEAD.

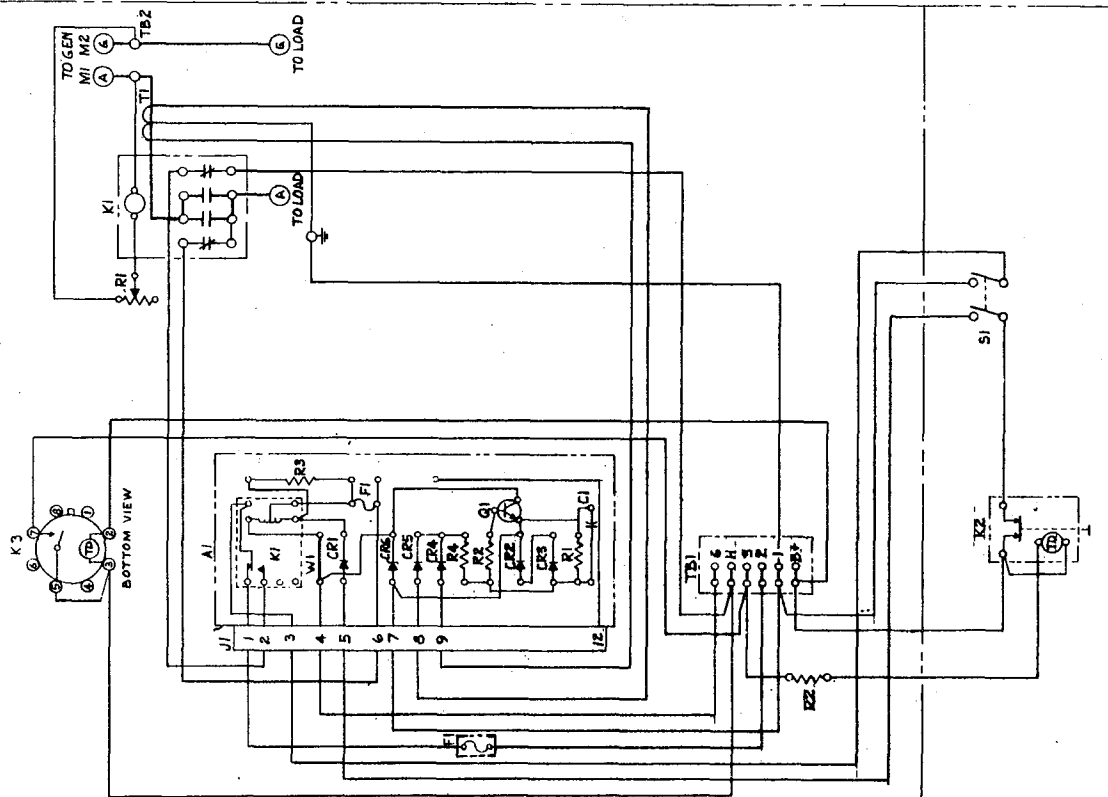
7.5HA-21/1C

REF. DES.	PART NO.	QTY.	DESCRIPTION
A1	300B740	1	CONTROL-LOAD SENSOR
	301A2280	2	BRACKET-MOUNTING
	51B4235	2	FASTENER-SHIP IN
K1	307C685	1	CONTACTOR
	332-142	2	TERMINAL
	307A685	2	JUMPER
	160A144	1	JUMPER
K2	320B104	1	RELAY-CRANKING LIMITER
R1	304A678	1	RESISTOR ASSY
	304A192 (RES)	1	RESISTOR-300 OHM 25 W
R2	304A192 (RES)	1	RESISTOR-3 OHM 10 W
S1	300F18	1	SWITCH-AUTO MANUAL
	325A344	1	TRANSFER-ASSY
TB1	322A888 (RES)	1	TERMINAL BLOCK
	322-140	2	MARKER-STRIP
TB2	322-140	2	TERMINAL-GROUND
W1	330C545	1	WIRING HARNESS
W2	332A592	1	JUMPER
	301C373	1	CONTROL BOX
	86C1815	1	SILASCREEN
	98A2285	1	SILASCREEN-SCHEMATIC
	301B7790	3	TRIM
	91A2287	1	FASTENER-TRIM
	98A688	1	MINI-PLATE-CONTROL
F1	321P153	1	FUSE, 3 AMP
	321-400 (REF)	1	BLOCK-FUSE

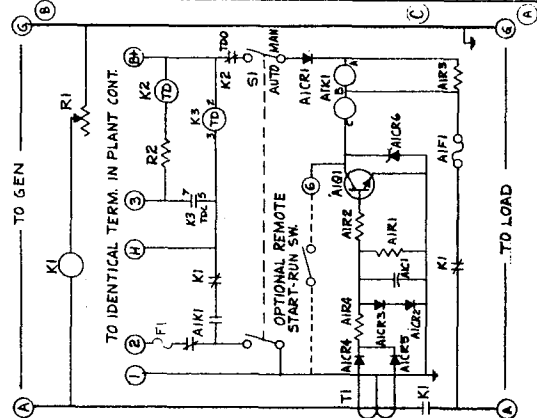
D	REVISED WIRING ON TB1	1	11/8-3-70
C	ADDED 33A592 (W2)	1	11/8-3-70
B	TRIM WAS 301B798B	1	11/8-3-70
A	ALSO SEE REF. 1	1	11/8-3-70
	ADDED 321P153 & 321-400	1	11/8-3-70
	11/8-3-70	1	11/8-3-70

7.5HA-21/1C	WIRING DIAGRAM	1	11/8-3-70
12V CRANKING	CONTROL - AUTO DEMAND	1	11/8-3-70
120V 1PH		1	11/8-3-70
2W		1	11/8-3-70

WIRING DIAGRAM
FRONT VIEW OF CHASSIS



SCHEMATIC



- NOTES:
1. OPERATE WITH NEGATIVE GROUND ONLY.
 2. IT IS NOT NECESSARY TO CONNECT TERMINAL 1 TO GEN BECAUSE GEN & CONTROL ARE CONNECTED THRU AC GROUND LEAD.

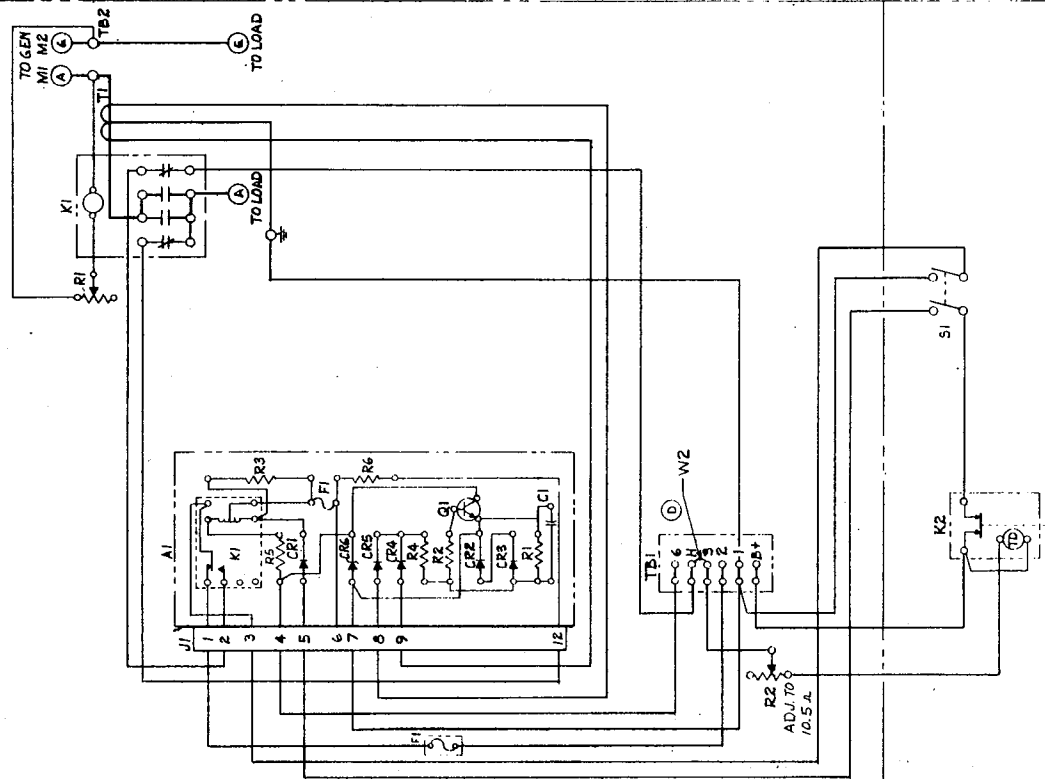
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7.5HA-21/10C

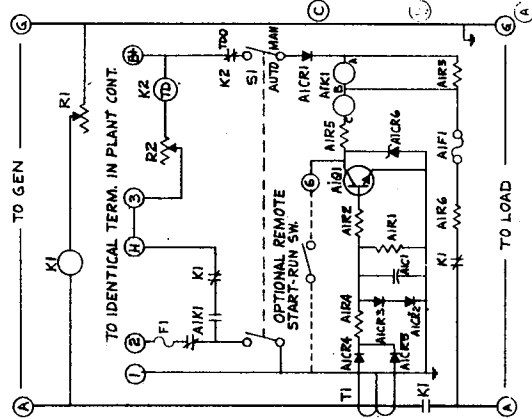
7.5HA-21/12C

617C138

WIRING DIAGRAM
FRONT VIEW OF CHASSIS



SCHEMATIC



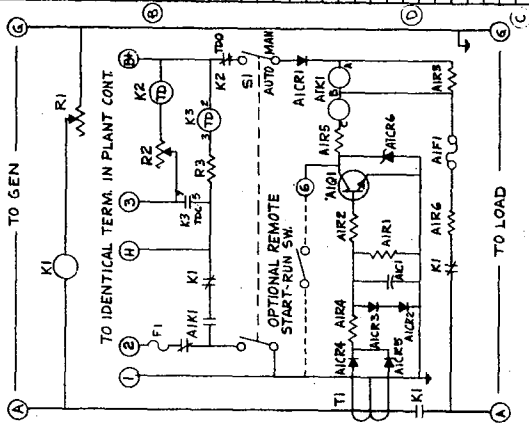
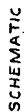
- NOTES:
1. OPERATE WITH NEGATIVE GROUND ONLY.
 2. IT IS NOT NECESSARY TO CONNECT TERMINAL 1 TO GEN BECAUSE GEN & CONTROL ARE CONNECTED THRU AC GROUND LEAD.

7.5HA-21-4/1C

D	REVISED WIRING ON TB1	W2	18-3-78
C	ADDED 332A592 (W2)	W2	18-3-78
B	REV. 415 318A385	W2	18-3-78
A	REV. 415 318A385	W2	18-3-78
A	REV. 321A593 & 321A592	W2	18-3-78
A	REV. 321A593 & 321A592	W2	18-3-78

Origin	WIRING DIAGRAM	W2	18-3-78
WIRING DIAGRAM	CONTROL-AUTO DEMAND	W2	18-3-78
617C138		W2	18-3-78

7.5HA-21-4/1C	32V CRANKING	120V 1PH 50/60 CY
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REF. DES.	PART NO	QTY	DESCRIPTION
A1	300743	1	CONTROL-LOG SENSOR
	3074350	2	BRACKET-RODING
	3184255	2	FASTENER-SHAP IN
K1	3073655	1	CONTACTOR
	332-142	2	TERMINAL
	3074655	2	JUMPER
	1504144	1	JUMPER
K2	3209100	1	RELAY-CRANKING LIMITER
K3	3074679 (01)	1	RELAY-TIME DELAY (20 SEC)
	322425714 (02)	1	RELAY-TIME DELAY (3 SEC)
	353A773	1	SOCKET ASST
R1	3044679	1	RESISTOR ASST
	3047392 (05)	1	RESISTOR-300 OHM 25 W
R2	3044722	1	RESISTOR-15 OHM 50 W
S1	308P48 (05)	1	SWITCH-AUTO MANUAL
	315-8344	1	TRANSFORMER ASST
T1	327A899 (05)	1	TERMINAL BLOCK
	327A940	1	MARKER STRIP
T2	332-142	2	TERMINAL-GROUND
R1	338C346	1	WIRING HARNESS
F1	30103273	1	CONTROL BOX
	98C1815	1	SLKSGREEN
	98A7240	1	SLKSGREEN-SUBMATIC
	30183393	1	TRIM
	518P237	3	FASTENER-TRIM
	98A966	1	NAMEPLATE-CONTROL
	321P153	1	FUSE, 3 AMP
	32100 REF	1	BLOCK - FUSE

617C139

NOTES:

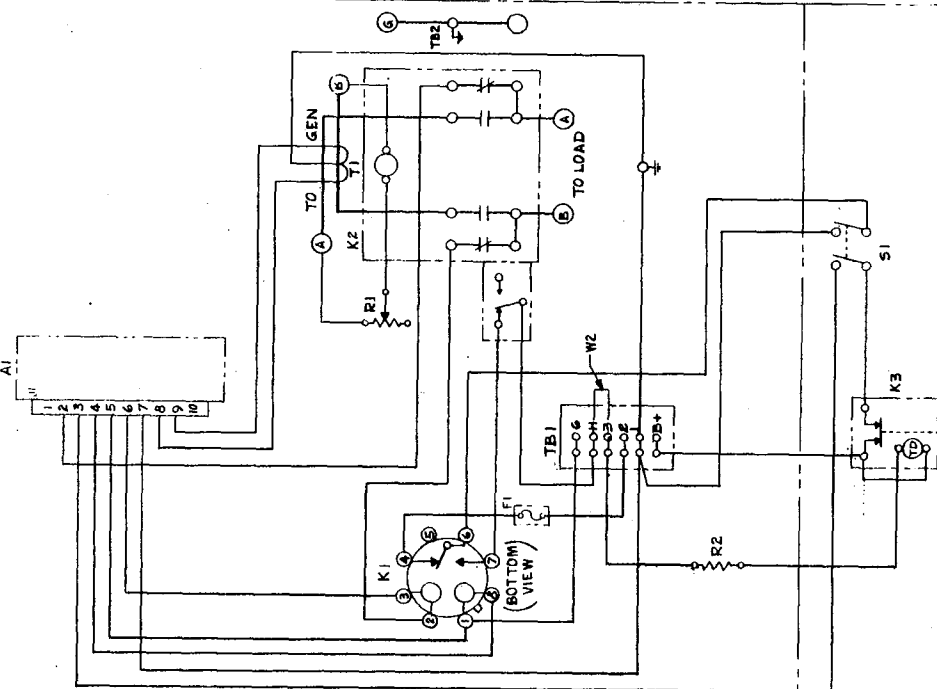
1. OPERATE WITH NEGATIVE GROUND ONLY.
2. IT IS NOT NECESSARY TO CONNECT TERMINAL 1 TO GEN BECAUSE GEN & CONTROL ARE CONNECTED THRU AC GROUND LEAD.

7.5HA-21-4/10C

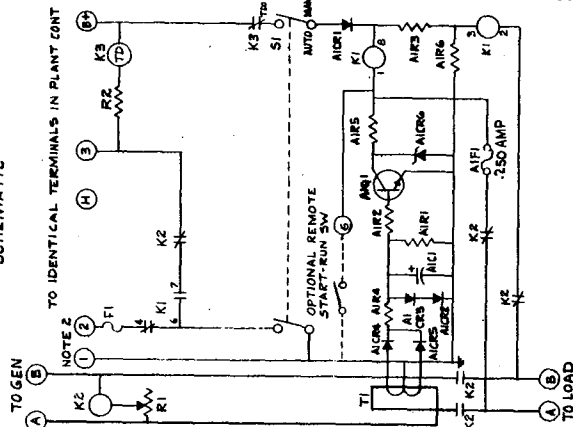
7.5HA-21-4/12C

[illegible]

617C140

WIRING DIAGRAM
FRONT VIEW OF CHASSIS

SCHEMATIC



REF. DES.	PART NO.	QTY.	DESCRIPTION
A1	30B247	1	AMPLIFIER ASST-LOAD SENSOR
	30B2380	2	BRACKET-MOUNTING
	51B295	2	FASTENER-SNAP IN
K1	307A859	1	RELAY-START RUN
K2	307C666	1	CONTACTOR
	18D-144	2	STRAP
	332-517	4	TERMINAL
	309A42	1	SWITCH-AUXILIARY
	309A193	1	INSULATOR
K3	320B104	1	RELAY-CRANKING LIMITER
	304A692	1	RESISTOR ASSY - 750 OHM 25W
R2	304A197 (REF)	1	RESISTOR-3 OHM 10W
S1	30B288 (REF)	1	SWITCH-AUTO MANUAL
T1	315A345	1	TRANSFORMER ASSY-CURRENT
TB1	332A698 (REF)	1	TERMINAL BLOCK
	332A840	1	MARKER STRIP
TB2	332-517	2	TERMINAL-GROUND
W1	338C552	1	WIRING HARNESS
W2	332A592	1	LUMPER
	301D3273	1	CONTROL BOX
	88C1815	1	SILSCREEN
	88A2752	1	SILSCREEN-SCHEMATIC
	301B2793	1	TRIM
	51B2237	3	FASTENER-TRIM
	88A886	1	NAMEPLATE-CONTROL
	617C140		
F1	321P153	1	FUSE-3 AMP
	321-100 (REF)	1	BLOCK-FUSE

7.5HA-23/1C

NOTES:

1. OPERATE WITH NEGATIVE GROUND ONLY.
2. IT IS NOT NECESSARY TO CONNECT TERMINAL 1 TO GEN BECAUSE GEN & CONTROL ARE CONNECTED THRU AC GROUND LEAD.

12V CRANKING

-01 7.5HA-23/1C

WIRING DIAGRAM
CONTROL-AUTO DEMAND120/240V 1PH
3W 50/60 CY

617C140

Origin

3-12-70 WKR JMD

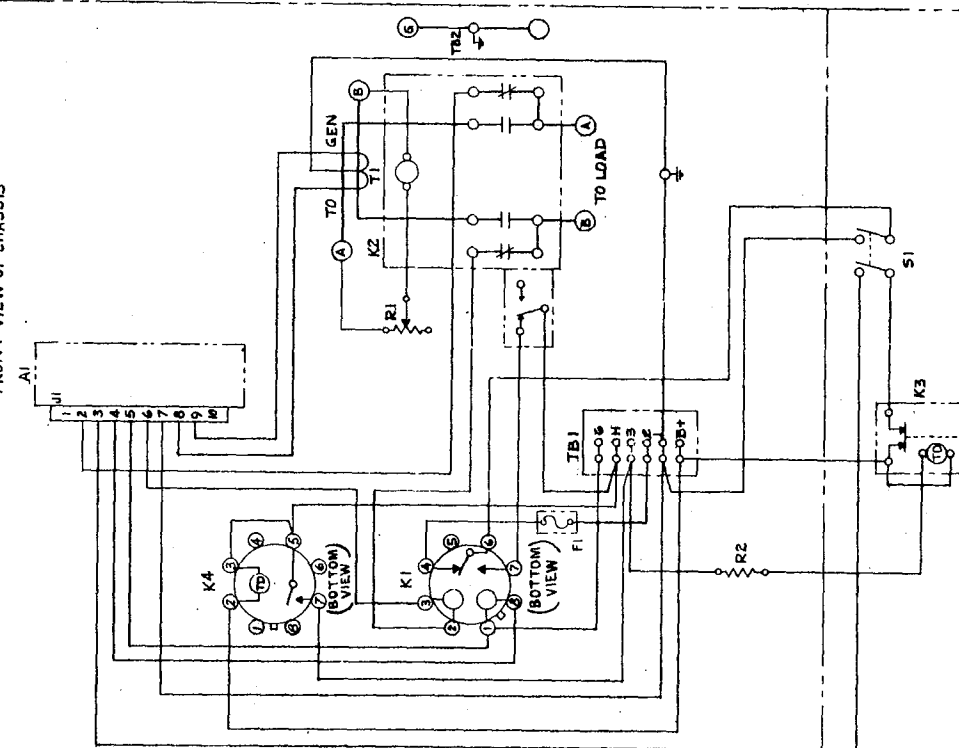
JMD

WIRING DIAGRAM

CONTROL-AUTO DEMAND

617C140

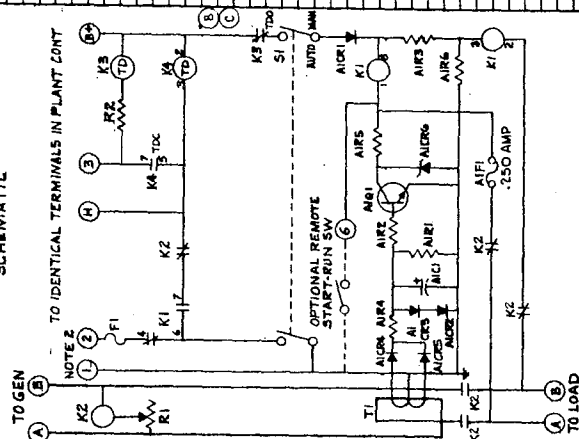
617C141

WIRING DIAGRAM
FRONT VIEW OF CHASSIS

NOTES:

1. OPERATE WITH NEGATIVE GROUND ONLY.
2. IT IS NOT NECESSARY TO CONNECT TERMINAL 1 TO GEN BECAUSE GEN & CONTROL ARE CONNECTED THRU AC GROUND LEAD.

SCHEMATIC



TO GEN
TO LOAD

NOTE 2 TO IDENTICAL TERMINALS IN PLANT CONT

REF. DES.	PART NO.	QTY.	DESCRIPTION
A1	3007147	1	AMPLIFIER ASSY-LOAD SENSOR
	3013280	2	BRACKET-MOUNTING
	5181295	2	FASTENER-SNAP IN
K1	3071858	1	RELAY-START RUN
K2	3070566	1	CONTACTOR
	180-144	2	STRAP
	332-517	4	TERMINAL
	309442	1	SWITCH-AUXILIARY
	3094183	1	INSULATOR
K3	3208104	1	RELAY-CRANKING LIMITER
K4	3071645(-00)	1	RELAY-TIME DELAY (20 SEC)
	3071689(-02)	1	RELAY-TIME DELAY (5 SEC)
	3234775	1	SOCKET ASST
R1	3044682	1	RESISTOR ASSY-750 OHM 25W
R2	3044192(REF)	1	RESISTOR-2 OHM 10W
S1	300P88(REF)	1	SWITCH-AUTO MANUAL
T1	3154345	1	TRANSFORMER ASST-CURRENT
TB1	3226959(REF)	1	TERMINAL BLOCK
TB2	332-517	2	MARKER STRIP
W1	3380552	1	WIRING HARNESS
	30103273	1	CONTROL BOX
	96C1815	1	SLIPSCREEN
	98A2752	1	SLIPSCREEN-SCHEMATIC
	30103293	1	TRIM
	5187237	3	FASTENER-TRIM
	98A866	1	NAMEPLATE-CONTROL
F1	321P153	1	FUSE 3 AMP
	321-100(REF)	1	BLOCK FUSE

617C141

7.5HA-23/10C

7.5HA-23/12C

REF. DES.	PART NO.	QTY.	DESCRIPTION
D	REVERSE WIRE 215MM	1	10-9-72
C	WAS 307A189	1	WAS 307A189
E	WAS 307A371	1	WAS 307A371
F	WAS 307A873	1	WAS 307A873
G	WAS 307A189	1	WAS 307A189
H	WAS 307A189	1	WAS 307A189
I	WAS 307A189	1	WAS 307A189
J	WAS 307A189	1	WAS 307A189
K	WAS 307A189	1	WAS 307A189
L	WAS 307A189	1	WAS 307A189
M	WAS 307A189	1	WAS 307A189
N	WAS 307A189	1	WAS 307A189
O	WAS 307A189	1	WAS 307A189
P	WAS 307A189	1	WAS 307A189
Q	WAS 307A189	1	WAS 307A189
R	WAS 307A189	1	WAS 307A189
S	WAS 307A189	1	WAS 307A189
T	WAS 307A189	1	WAS 307A189
U	WAS 307A189	1	WAS 307A189
V	WAS 307A189	1	WAS 307A189
W	WAS 307A189	1	WAS 307A189
X	WAS 307A189	1	WAS 307A189
Y	WAS 307A189	1	WAS 307A189
Z	WAS 307A189	1	WAS 307A189

12V CRANKING

-01 7.5HA-23/10C

-02 7.5HA-23/12C

120/240V 1PH 3W 50/60CY

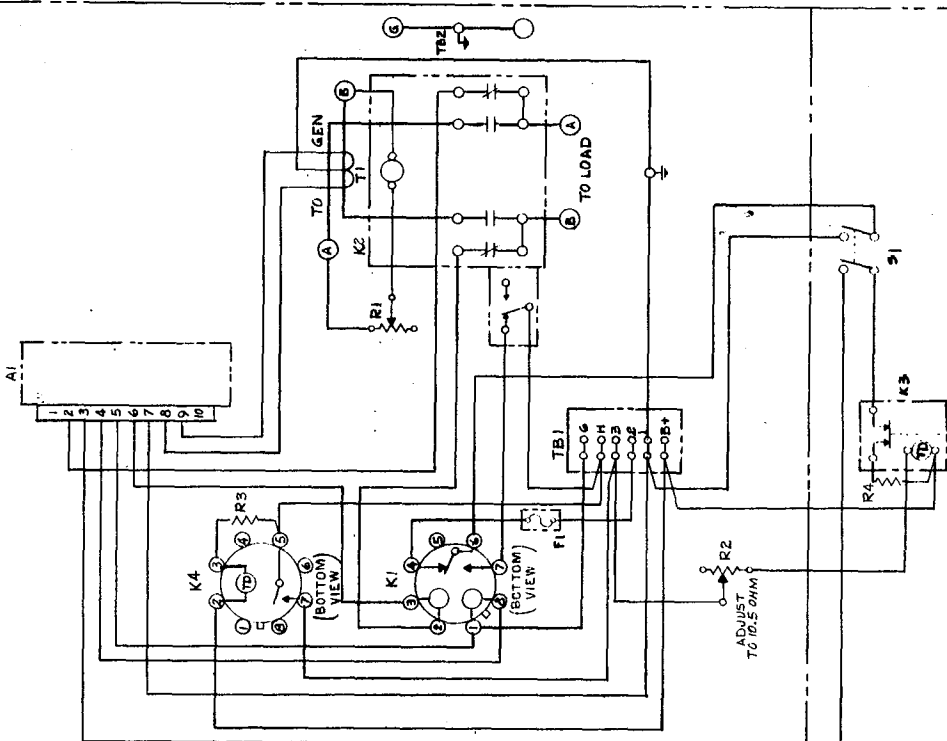
WIRING DIAGRAM

CONTROL-AUTO DEMAND

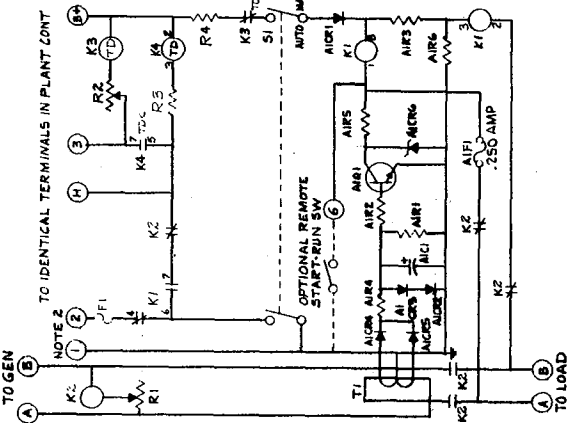
617C141

617C142

WIRING DIAGRAM
FRONT VIEW OF CHASSIS



SCHEMATIC



REF. DES.	PART NO.	QTY.	DESCRIPTION
A1	3089747	1	AMPLIFIER ASSY-LOAD SENSOR
	3013280	2	BRACKET-MOUNTING
K1	518295	2	FASTENER-SNAP IN
K2	307658	1	RELAY-START RUN
	307666	1	CONTACTOR
	160-144	2	STRAP
	332-517	4	TERMINAL
	30942	1	SWITCH-AUXILIARY
	3094193	1	INSULATOR
K3	3208104	1	RELAY-CRANKING LIMITER
K4	30748791-001	1	RELAY-TIME DELAY (20 SEC)
	30748791-021	1	RELAY-TIME DELAY (5 SEC)
	3234773	1	SOCKET ASSY
R1	3044 682	1	RESISTOR ASSY-750 OHM 25W
R2	3044222	1	RESISTOR-15 OHM 50W
R3	350-520(REF)	1	RESISTOR-47 OHM 1/2W
R4	350-384	1	RESISTOR-750 OHM 2W
T1	30898(REF)	1	SWITCH-AUTO MANUAL
	3154345	1	TRANSFORMER ASST-CURRENT
TR1	3224594(REF)	1	TERMINAL BLOCK
	3224940	1	MARKER STRIP
TR2	327-142	2	TERMINAL-GROUND
W1	338C 553	1	WIRING HARNESS
	3013223	1	CONTROL BOX
	98C1815	1	SILKSCREEN
	98A252	1	SILKSCREEN-SCHEMATIC
	3013293	1	TRIM
	5182237	3	FASTENER-TRIM
	98A866	1	NAMEPLATE-CONTROL
			247C119
F1	321P153	1	FUSE, 3 AMP
	321-100(REF)	1	BLOCK-FUSE

7.5HA-23-4/10C

7.5HA-23-4/12C

NOTES:

1. OPERATE WITH NEGATIVE GROUND ONLY
2. IT IS NOT NECESSARY TO CONNECT TERMINAL 1 TO GEN BECAUSE GEN & CONTROL ARE CONNECTED THRU AC GROUND LEAD

B. REVERSE WIRES 243 ON K1	30748791-001	30748791-021
A. FALTER REF	30748791-001	30748791-021
3. 4010 52P153 A, 321-100	30748791-001	30748791-021

32VCRANKING

7.5HA-23-4/10C

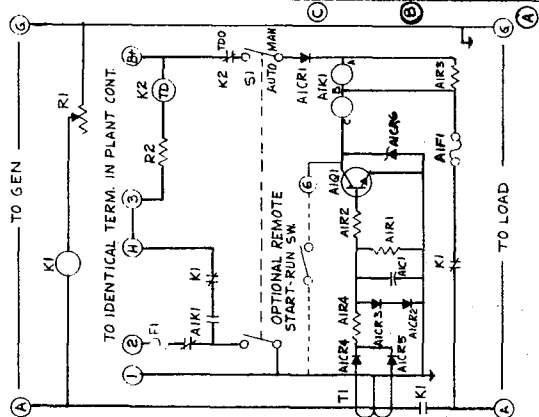
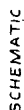
7.5HA-23-4/12C

120/240V 1PH 3W 50/60 CY

WIRING DIAGRAM

CONTROL-AUTO DEMAND

617C142

[illegible]

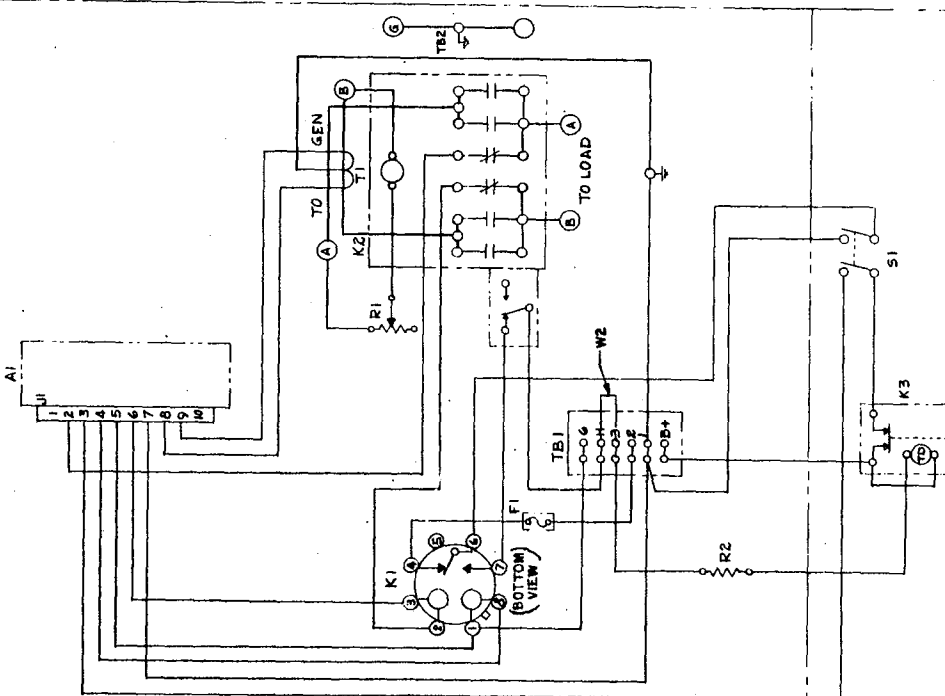
Notes:

1. OPERATE WITH NEGATIVE GROUND ONLY
2. IT IS NOT NECESSARY TO CONNECT TERMINAL 1 TO GEN BECAUSE GEN & CONTROL ARE CONNECTED THRU AC GROUND LEAD

15.0HA-22/1C

[illegible]

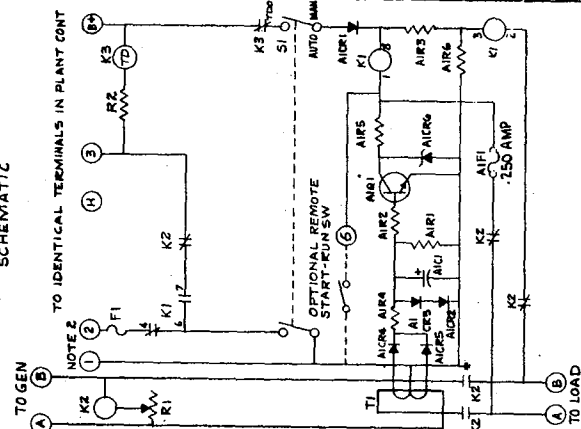
617C143

WIRING DIAGRAM
FRONT VIEW OF CHASSIS

NOTES:

1. OPERATE WITH NEGATIVE GROUND ONLY.
2. IT IS NOT NECESSARY TO CONNECT TERMINAL 1 TO GEN BECAUSE GEN & CONTROL ARE CONNECTED THRU AC GROUND LEAD.

SCHEMATIC



REF. DES.	PART NO.	QTY.	DESCRIPTION
A1	3009747	1	AMPLIFIER ASST-LOAD SENSOR
	30193280	2	BRACKET-MOUNTING
	5184295	2	FASTENER-SHAP IN
K1	3074558	1	RELAY-START RUN
K2	3076587	1	CONTACTOR
	180-144	2	STRAP
	3074842	2	BUS BAR
	332-142	4	SLEEVING 1-3/4" OF (888-27)
	309442	1	TERMINAL
	3094193	1	SWITCH-AUXILIARY
	3074885	4	INSULATOR
	3208104	1	RELAY-CRANKING LIMITER
R1	3044682	1	RESISTOR ASST-750 OHM, 25 W
R2	3044192(REF)	1	RESISTOR-3 OHM, 10 W
S1	3089881(REF)	1	SWITCH-AUTO MANUAL
T1	3153346	1	TRANSFORMER ASST-CURRENT
W1	3321689(REF)	1	TERMINAL BLOCK
W2	3321910	1	MARKER STRIP
	332-142	2	TERMINAL-GROUND
	3385552	1	WIRING HARNESS
	3321592	1	JUMPER
	3013272	1	CONTROL BOX
	88015	1	SLIPSCREEN
	3013273	1	SLIPSCREEN-SCHEMATIC
	5184295	3	FASTENER-TORN
	5184297	3	FASTENER-TORN
	954666	1	MANEPLATE-CONTROL
F1	3210153	1	FUSE, 3 AMP
	321-000(REF)	1	BLOCK - FUSE

15.0HA-23/1C

12 V CRANKING

-01 150HA-23/1C

WIRING DIAGRAM

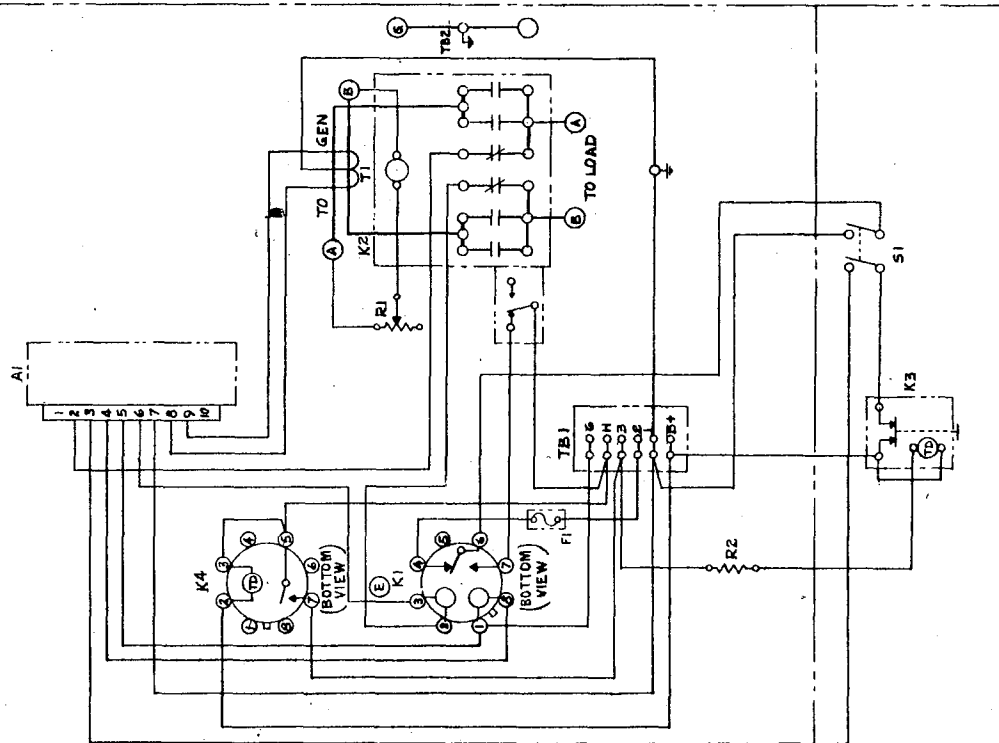
CONTROL-AUTO DEMAND

120/240V 1PH 50/60 CY

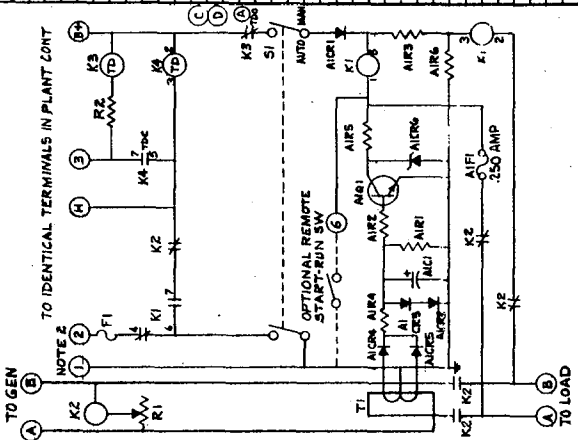
REV.	DESCRIPTION	DATE	BY	CHKD.
1	REVERSE WIRES 243 ON K1	10/17/70	JWD	
2	RELEU/REF	10/17/70	JWD	
3	RELEU/REF	10/17/70	JWD	
4	RELEU/REF	10/17/70	JWD	
5	RELEU/REF	10/17/70	JWD	
6	RELEU/REF	10/17/70	JWD	
7	RELEU/REF	10/17/70	JWD	
8	RELEU/REF	10/17/70	JWD	
9	RELEU/REF	10/17/70	JWD	
10	RELEU/REF	10/17/70	JWD	

617C144

WIRING DIAGRAM
FRONT VIEW OF CHASSIS



SCHEMATIC



REF. DES.	PART NO.	QTY.	DESCRIPTION
A1	300747	1	AMPLIFIER ASST-LOAD SENSOR
	3013280	2	BRACKET-MOUNTING
K1	307285	2	FASTENER-SNIP IN
K2	307285	1	RELAY-START RUN
	307287	1	CONTACTOR
	160-144	2	STRAP
	307282	2	BUS BAR
	332-142	2	SLEEVING 1-3/4" OF (899-22)
	309442	4	TERMINAL
	3094193	1	SWITCH-AUXILIARY
	3074685	4	INSULATOR
K3	3208104	1	JUMPER
K4	3074645 (-01)	1	RELAY-DRAWING LIMITER
	3074689 (-02)	1	RELAY-TIME DELAY (20 SEC)
	3234775	1	RELAY-TIME DELAY (5 SEC)
R1	3044652	1	SOCKET ASSY
R2	3044192 (REF)	1	RESISTOR ASST-750 OHM, 25W
	3044192 (REF)	1	RESISTOR-3 OHM, 10W
S1	300881 (REF)	1	SWITCH-AUTO MANUAL
T1	315346	1	TRANSFORMER ASST-CURRENT
TB1	3324693 (REF)	1	TERMINAL BLOCK
TB2	3324940	1	MARKER STRIP
W1	332-142	2	TERMINAL-GROUND
	338552	1	WIRING HARNESS
	30103273	1	CONTROL BOX
	98C1815	1	SILKSCREEN
	98A252	1	SILKSCREEN-SCHEMATIC
	3018293	1	TRIM
	518227	3	FASTENER-TRIM
	98A866	1	NAMEPLATE-CONTROL
			617C144
F1	321P153	1	FUSE, 3 AMP
	321-100 (REF)	1	BLOCK-FUSE

15.0HA-23/10C

15.0HA-23/12C

E	REVERSED WIRES 2 & 3 ON W10	30	10-10
D	WAS 3074169	30	10-10
C	WAS 3074371	30	10-10
B	WAS 3074371	30	10-10
A	WAS 3074371	30	10-10
	ADDED (REF)	30	10-10
	RELOC 321P153 & 321-100	30	10-10
	WAS 304A131	30	10-10
	WAS 304A131	30	10-10

12V CRANKING

3-12-70 WKR

150HA-23/10C

150HA-23/12C

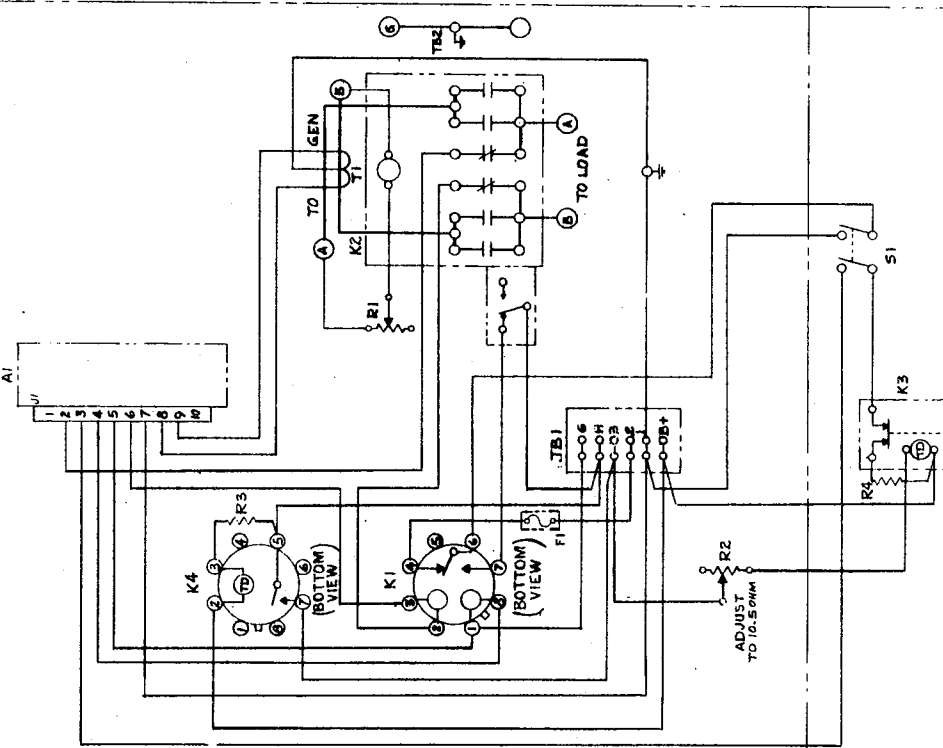
120/240V 1PH 50/60 CY

3 W

617C144

- NOTES:
1. OPERATE WITH NEGATIVE GROUND ONLY.
 2. IT IS NOT NECESSARY TO CONNECT TERMINAL 1 TO GEN BECAUSE GEN & CONTROL ARE CONNECTED THRU AC GROUND LEAD.

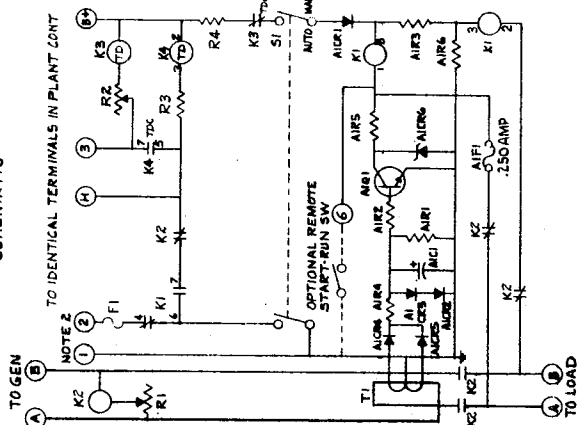
617C145

WIRING DIAGRAM
FRONT VIEW OF CHASSIS

NOTES:

1. OPERATE WITH NEGATIVE GROUND ONLY.
2. IT IS NOT NECESSARY TO CONNECT TERMINAL 1 TO GEN BECAUSE GEN & CONTROL ARE CONNECTED THRU AC GROUND LEAD.

SCHEMATIC



A

REF. DES.	PART NO.	QTY	DESCRIPTION
A1	3007747	1	AMPLIFIER ASSY-LOAD SENSOR
	3013380	2	BRACKET-MOUNTING
K1	518295	2	FASTENER-SNAP IN
K2	307858	1	RELAY-START RUN
	307667	1	CONTACTOR
	160-144	2	STRAP
	3077442	2	BUS BAR
	332-142	2	SLEEVING 1/3 A.D.F. (898-22)
	309442	4	TERMINAL
	3094193	1	SWITCH-AUXILIARY
	3074685	4	JUMPER
K3	3208104	1	RELAY-DRAINING LIMITER
K4	3074879(-01)	1	RELAY-TIME DELAY (20 SEC)
	3074971(-02)	1	RELAY-TIME DELAY (5 SEC)
	3234773	1	SOCKET ASSY
R1	3044662	1	RESISTOR ASSY-750 OHM 25W
R2	3044222	1	RESISTOR-15 OHM 50W
R3	350-520(REF)	1	RESISTOR-47 OHM 1/2W
R4	350-384	1	RESISTOR-750 OHM 2W
S1	308881(REF)	1	SWITCH-AUTO MANUAL
T1	3154246	1	TRANSFORMER ASST-CURRENT
TB1	3324699(REF)	1	TERMINAL BLOCK
TB2	332-142	2	TERMINAL-GROUND
W1	338553	1	WIRING HARNESS
	3013273	1	CONTROL BOX
	98C1815	1	SILKSCREEN
	98A252	1	SILKSCREEN-SCHEMATIC
	3018293	1	TRIM
	518237	3	FASTENER-TRIM
	99A866	1	WATERPLATE-CONTROL
			54121/9
F1	321P153	1	FUSE 3 AMP
	321-100(REF)	1	BLOCK-FUSE

15.0HA-23-4/10C

15.0HA-23-4/12C

32V CRANKING

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DIVISION 3 SHIPBOARD CORPORATION

3-12-70
15.0HA-23-4/10C
15.0HA-23-4/12C

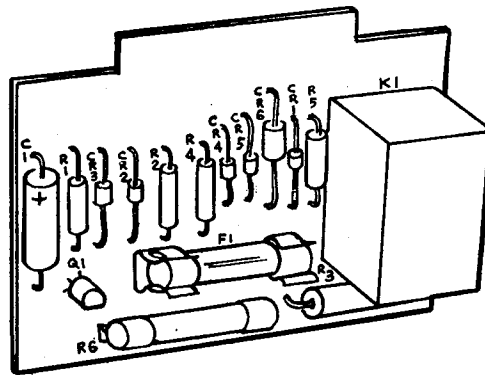
WIRING DIAGRAM
CONTROL-AUTO DEMAND

617C145

120/240V 1PH
3W 50/60 CY

REV	DESCRIPTION	DATE	BY	CHK	APP
1	REV	10/15/70	10/15/70		
2	REV	10/15/70	10/15/70		
3	REV	10/15/70	10/15/70		
4	REV	10/15/70	10/15/70		
5	REV	10/15/70	10/15/70		

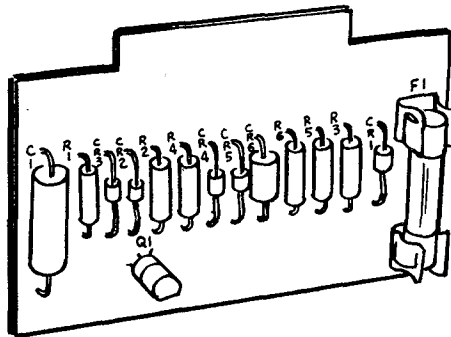
**300B740, 300B741 AND 300B743 PRINTED CIRCUIT BOARDS
(FOR 2-WIRE CONTROLS)**



COMPONENT	PART NUMBER	QTY. USED	DESCRIPTION
R1	350-540 (p.c. board 300B741)	1	Resistor, 2.2 K ohm
	350P548 (p.c. board 300B740, 300B743)	1	Resistor, 10 K ohm
R2	350-528	1	Resistor, 220 ohm
R3	352A111 (p.c. board 300B740, 300B743)	1	Resistor, 47 ohm
	352-119 (p.c. board 300B741)	1	Resistor, 100 ohm
R4	350-520	1	Resistor, 47 ohm
R5	350-538 (p.c. board 300B743 only)	1	Resistor, 1.5 K ohm
R6	352A156 (p.c. board 300B743 only)	1	Resistor, 150 ohm
C1	356A9	1	Capacitor, 10 mfd
CR1 - CR5	357A4	5	Diode, 400 MA
CR6	359A18 (p.c. board 300B743)	1	Diode, Zener
	359A29 (p.c. board 300B740, 300B741)	1	Diode, Zener
F1	321-168	1	Fuse, 1/4 ampere
K1	307A1087	1	Relay, Dual Coil
MP1	332B1299 (p.c. board 300B740, 300B741)	1	Board, Printed Circuit
	332B1304 (p.c. board 300B743)	1	Board, Printed Circuit
Q1	362A7 (p.c. board 300B740, 300B741)	1	Transistor, Signal
	362A14 (p.c. board 300B743)	1	Transistor, Signal
	321P163	2	Clip, Fuse

NOTE: Components R5 and R6 on p.c. board 300B743 only.

**300B747 PRINTED CIRCUIT BOARD
(FOR 3-WIRE CONTROLS)**



COMPONENT	PART NUMBER	QTY. USED	DESCRIPTION
R1	350-540	1	Resistor, 2.2 K ohm
R2	350-528	1	Resistor, 220 ohm
R3	350-528	1	Resistor, 220 ohm
R4	350-520	1	Resistor, 47 ohm
R5	350-524	1	Resistor, 100 ohm
R6	350-528	1	Resistor, 220 ohm
C1	356A9	1	Capacitor, 10 mfd
CR1 - CR5	357A4	5	Diode, 400 MA
CR6	359A29	1	Diode, Zener
F1	321-168	1	Fuse, 1/4 ampere
MP1	332B1308	1	Board, Printed Circuit
Q1	362A7	1	Transistor, Signal
	321P163	2	Clip, Fuse